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THE SRI LANKAN GENUS *ASPIDURA* (SERPENTES,
REPTILIA, COLUBRIDAE)

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ABSTRACT

Review of a collection of snakes of the genus *Aspidura* recently made on Sri Lanka, and of some museum material, including all available types, documents the occurrence of the six species—*A. brachyorrhos*, *copei*, *deraniyagalae* new species, *drummondhayi*, *guentheri*, and *trachyprocta*. The forms are defined and illustrated, their geographical and altitudinal ranges clarified, and available ecological data reviewed. The review suggests that the genus is restricted to Sri Lanka and that the record from Malé Atoll in the Maldivé Archipelago represents an error.

INTRODUCTION

The surveys of the amphibians and reptiles of India culminating in the monumental three volume report of Malcolm Smith (1931, 1935, 1943) have left us with characterizations of some major categories of the herpetofauna of that subcontinent. Unfortunately, they also incorporate the seeds of confusion. Many of the specimens upon which they are based were inadequately characterized, and elevational and ecological information were generally missing. Locality names were sometimes misinterpreted, and the samples were inadequate to describe the several kinds of variability.

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As a by-product of an attempt better to understand the biology of uropeltid snakes, a well-documented series of the small and crepuscular reptiles and amphibians of Sri Lanka is being assembled. We here review the small snakes of the genus *Aspidura* in order more accurately to characterize the definitions and distributions of the various species. This report reviews material recently collected and compares it with other specimens in major museums. The type-specimens of all nominal species, except one, have been reexamined.

MATERIALS AND METHODS

The material here discussed mainly results from recent collecting work on Sri Lanka. (AL, CG and F numbers; when these follow the designation of another museum, the specimen has already been deposited there.) Locality and elevational data are available for these specimens. The latter datum is important as these species occupy extremely steeply sloping hill sides and town and local settlement names by themselves are insufficient for determination of elevation. (We borrowed only some museum specimens, emphasizing those that had specific localities, beyond that of country. However, under Locality Records, we list, in brackets, all those records noted in the literature and in museum collections of which we are aware. Some specimens in various collections were examined after this report had been completed. Their numbers are preceded by an asterisk (*) under Locality Records, but their counts are generally omitted from the tables.) Catalog numbers for specimens deposited in Sri Lanka are not yet available.

The available data pose some problems relating to the topography of Sri Lanka. The higher mountain ranges are steep with many hill sides inclined at more than 45 degrees. The altitude of localities separated by only a short distance may differ by 500 m. Consequently, the elevation assigned to specimens must be that at which they were actually collected, rather than that of the nearest settlement. As most such information is available for the recent collections they have been emphasized here.

Most of the previous records pose no problems. However, the elevations given in the literature records for the Namunukula area do. The elevations of several of the estates within a few kilometers of the town range from 400 to near 1500 m. While *A. brachyrrhos* and *A. trachyprocta* may be sympatric here, the recent collections indicate that the zone of sympatry is much narrower than that suggested by the collections now in the British Museum.

Material from the following museums was available for comparison. We thank the curators, names in parentheses, who facilitated the loans.

AL—Field number, Carl Gans collection.

AMNH—American Museum of Natural History, New York (R. G. Zweifel).

ANSP—The Academy of Natural Sciences at Philadelphia, Pennsylvania (M. A. MacFarlane and T. M. Uzzell).

BM—British Museum (Natural History), London (A. G. C. Grandison and E. N. Arnold).

BNHM—Bombay Natural History Society, Bombay, India (J. C. Daniel).

CG—Carl Gans collection, Ann Arbor, Michigan.

CM—Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (C. J. McCoy).

F—Field number Carl Gans collection.

FMNH—Field Museum of Natural History, Chicago, Illinois (H. K. Voris).

KU—Museum of Natural History, The University of Kansas, Lawrence, Kansas (W. E. Duellman).

MCZ—Museum of Comparative Zoology, Cambridge, Massachusetts (J. P. Rosado).

MHNP—Museum National d'Histoire Naturelle, Paris, France (R. Roux-Estève).

NHMB—Naturhistorisches Museum zu Basel, Switzerland (U. Rahm).

NMSL—National Museum, Colombo, Sri Lanka (R. Ratnapala and P. H. D. H. de Silva). [This museum now appears to have only *A. trachyprocta*, though the catalog lists other species as well.]

USNM—United States National Museum, Washington, D.C. (G. Zug).

ZMB—Zoologisches Museum, Berlin, D. D. R. (Specimens kindly checked by Dr. G. Peters).

ZMH—Zoologisches Museum, Hamburg, F. D. R. (H. W. Koepke).

ZSI—Zoological Survey of India, Calcutta, India (K. K. Tiwari).

Characters initially examined for each specimen include the numbers of ventrals, subcaudals, and dorsal scale rows, the head scalation pattern, and the color pattern. The various characters were determined as follows:

Sex.—Some specimens were sexed through a midventral incision anterior to the cloaca, by noting the presence of ovaries and oviducts or testes and associated ducts. In some cases the base of the tail was also cut to detect the hemipenes or scent glands. When the distribution of a meristic character suggested a bimodal pattern, a number of animals were selected for sexing; however, only about 20% of the total number of specimens were sexed.

Ventral scales.—Ventrals were counted from the first scale adjacent to the posterior pair of chin shields, up to, but not including the anal plate. The number of narrow anterior ventrals, flanked on each side by an extra dorsal row, was also noted. These latter scales are not to be confused with the additional scale rows that some species show more dorsally. The 75% error bounds for the mean number of ventral scales and subcaudal scales were calculated based on Chebyshev's inequality (mean ± 2 standard error of the mean), which is independent of the distribution of the population being sampled (Schaeffer et al., 1979). These error bounds are included in the species diagnoses.

Subcaudal scales.—The subcaudals were examined to note which were azygous and which divided. Subcaudals were counted from the first scale posterior to the cloacal slit up to the scales immediately preceding the terminal spine.

Dorsal scale rows.—The dorsal scale rows were counted diagonally across the back in the neck region (near ventral 10), at mid-body, and in the precloacal region. When additional scale rows occurred in the nuchal region (as in *A. trachyprocta*), the anterior count was made posterior to their point of termination, although the presence of additional rows was noted. Some specimens (of *A. trachyprocta*) have portions of the second and third scale rows variably fused in the cloacal region. Such fusions were uncommon, and the number of precloacal rows of dorsal scales was determined in regions in which no fusion was noted.

Snout-vent length.—Snout-vent length was measured by pressing the snake against a meter stick. Repeated measurements of the same snake agreed within $\pm 2\%$.

Tail length.—Tail length was measured from the posterior edge of the scale preceding the anal plate to the tip of the tail.

Head scalation.—The number, relative sizes, and pattern of head scales on each snake were examined under a dissecting scope. Particular features useful in distinguishing among species included the presence or absence of a preocular, the relative size of the two postoculars, the number of postoculars contacting the parietal, and contact or lack of contact between prefrontal and orbit. The maximum linear dimension of the postocular was measured.

Color patterns.—The ground color of the dorsal and ventral regions were noted, as were the array of scale markings, their size and distribution.

GENERIC ASSIGNMENT

The head scalation and general habitus easily distinguish the small snakes of the genus *Aspidura* from all other forms in Sri Lanka, except

for the monotypic *Haplocercus ceylonensis*. The latter differs from known species of *Aspidura* (see Smith, 1943; Deraniyagala, 1955) in having higher numbers of ventrals (more than 160 rather than fewer than 161) and caudals (more than 37, rather than fewer than 36, except for one specimen of *A. brachyorrhos*, MCZ 39818), by fusion of the nasal with the first supralabial, by a blunter snout, and by much lower numbers (10 to 12, rather than more than 20) of subequal maxillary teeth.

The somewhat larger Indian species *Blythia reticulata*, *Xylophis perroteti*, and *X. stenorhynchus* also are superficially similar to species of *Aspidura*. *Blythia* may be differentiated by the paired anal plate; the species of *Xylophis* by their loreal scales and contact between mental and chin shields. All three have paired internasals.

The head of *Aspidura* is not distinct from the neck and the cylindrical body gradually increases in diameter to the third quarter and then gradually diminishes, more sharply posterior to the cloaca and on the short tail. The nostril is enclosed by two nasals that lie dorsal and lateral to it and by the ventrally positioned first supralabial. There are six supralabials and six infralabials. The fourth supralabial always forms the ventral border of the orbit. The single median internasal is diamond-shaped and contacts the rostral and nasals anteriorly and the prefrontal posteriorly. The frontol is in broad contact with the supraocular. There is no loreal, but there may be a preocular; two postoculars are the rule, although they may rarely be fused. The elongate parietals are the largest scales on the head; laterally they are flanked by one first and two elongate second temporals on each side. The mental scale is about three times as wide as long, and the medially-contacting first infralabials are followed by two (three in the holotype of *A. copei*) pairs of elongate chin shields. The ventrals are rounded. The scales of the trunk are smooth and lack apical pores; the lateral scales in the cloacal region of some species may be spinose.

Less obvious characteristics mentioned by Smith (1943) are the tendency to have subelliptical rather than round pupils, the occurrence of hypapophyses throughout the vertebral column, and the presence of hemipenes similar to those of *Trachischium*.

MAJOR GROUPINGS

Examination of the available specimens revealed variability in such characters as counts of ventrals and subcaudals, and to a lesser extent color pattern. However, it was possible to characterize six groups of snakes based on (1) the number of scale rows at midbody, (2) presence or absence of a preocular scale, (3) contact (or lack of contact) between prefrontal and orbit, (4) number of postoculars contacted by the pa-

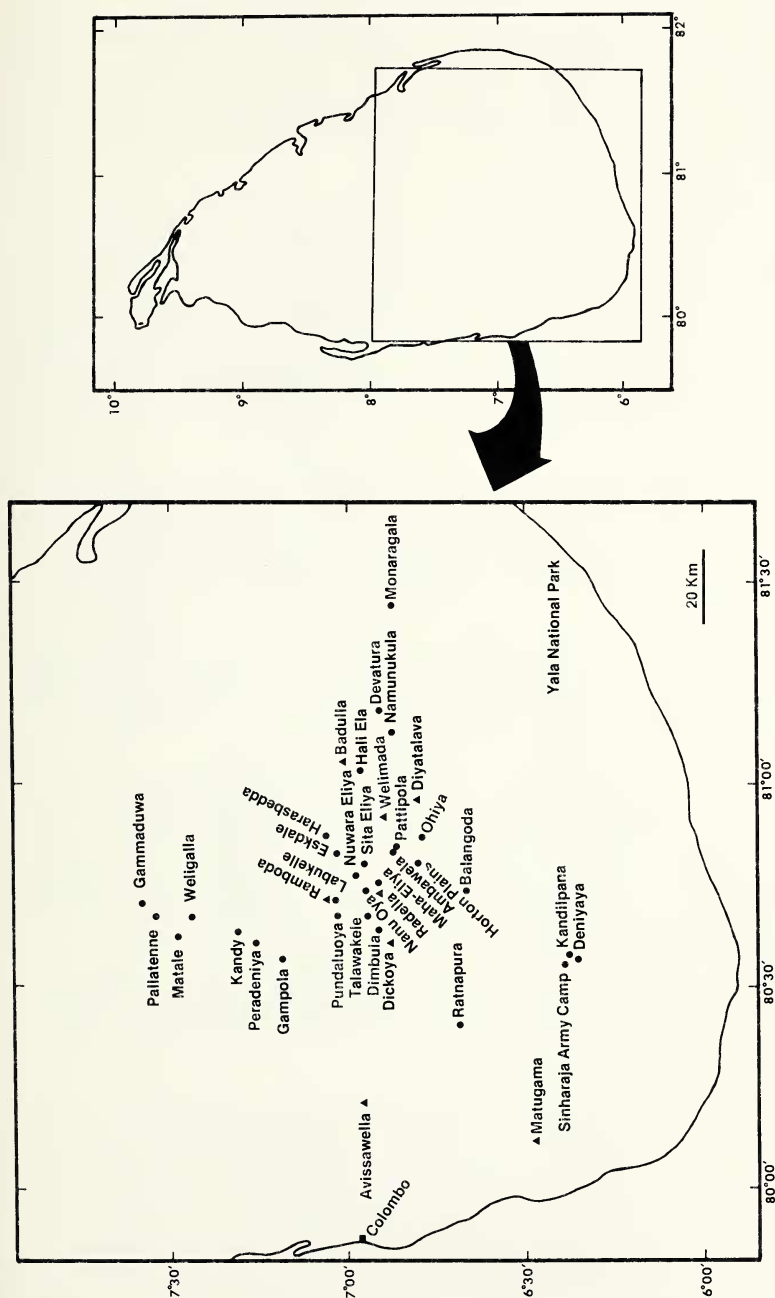


Fig. 1.—Sketch map to show the localities for the six species of *Aspidura*. Dots refer to specimens available for this study, triangles to literature records, squares to sites presented for orientation. The sites of Kadriyanam, Kambaddy, Kumbakkan, Medamaha Nuwara, Neboda, and Rosagalla could not be placed with certainty and are omitted from the map.

rietal, (5) the relative length of the upper and lower postoculars, and (6) the condition (single or divided) of the subcaudal scales.

The six groups (Table 1) and their ranges are as follows (Localities in parentheses are those of specimens from museum collections obtained on loan; we also list in parentheses the names ultimately assigned to the taxa.):

The first group (*A. brachyorrhos*) is widely distributed (Fig. 1) with new records (museum specimens in parentheses) from Devatura Rd. near Namunukula, (Dimbulla), Gammaduwa, Gampola, Hali Ela, Kandy, (Matale), (Medamaha Nuwara), (Monaragala), (Namunukula), Pallatenne (Peradeniya), (Pundaluoya), and Weligalla. All sites (except the museum records for Namunukula, which refers to a trading center amid a very steep tea-planted mountainside ranging from 300 to above 1400 m, and Pundaluoya at 1230 m) are between 350 and 900 m in elevation.

The second group (*A. copei*) was not included in the collection. Only the "no locality" holotype and six other specimens are available.

The third group (*A. drummondhayi*) is recorded on the basis of a single specimen taken above Deniyaya (Sinharaja Army Camp, nr. 1040 m). Other records (Balangoda) are also from the southwestern portion of Sri Lanka.

The fourth group (*A. guentheri*) is recorded from Deniyaya, Kandilpana, Ratnapura, (Rosagalla ?), (Yala National Park), and Yapitikanda (nr. Deniyaya), all lowland forest localities in the southern portion of Sri Lanka.

The fifth group (*A. trachyprocta*) is recorded from localities in the central mountain region, over a wide range, generally above 750 m. Localities are Ambawela, (Bopatalawa), Eskdale, Gammaduwa, Harasbedda, (Horton Plains), Kanawarella, (Kurnbakkan ?), Labukelle, Langton Estate, (Maha Eliya), (Medamaha Nuwara), (Moneragala), (Namunukula), (Nanu Oya), Nuwara Eliya, (Ohiya), Pattipola, Pindarawatta, (Pundaluoya), Sita Eliya, and (Talawakele).

The sixth group (*A. deraniyagalae*) is known only from Kanawarella, Pindarawatta, and the Spring Valley Road, all above Namunukula at high (1000 m+) elevation sites on the southeastern portion of the central mountains.

The ranges of the groups differ markedly in size and overlap. Group 5 ranges widely over the central mountains at high elevations; its seeming sympatry with group 1 over a wide area breaks down when one notes that the latter is generally obtained at lower elevations. While the ranges of groups 3 and 4 suggest that they occur at adjacent localities in the southwestern portion of the island, the record for group 3 is again for a higher elevation. Little can be stated about group 2, as only one specimen bears locality data and another locality (referring

Table 1.—Summary of the pattern of characters for the six species of *Aspidura*.

Characters	<i>brachyorthos</i>	<i>copei</i>	<i>deraniyagalae</i>	<i>drummondhayi</i>	<i>guentheri</i>	<i>trachyprocta</i>
Dorsal scale rows	17	17	17	15	17	15
Preoculars	present	absent	present	absent	present	present
Prefrontals	excluded from orbit	contacts orbit	contacts orbit	contacts orbit	contacts orbit	contacts orbit
Number of postoculars touching parietal	2	2	2	2	1 (upper)	2
Largest postocular	lower	lower	lower	lower	upper or subequal	lower
Number of ventrals	146.07 \pm 2.58	129.14 \pm 3.36	119.92 \pm .73	113, 118, 119	112.48 \pm 2.53	137.66 \pm .84
Number of subcaudals	31.37 \pm 1.27	24 \pm 6.93	17.77 \pm 2.82	18, 18, 26	22.35 \pm 1.12	18.70 \pm .74

to a district) is suspect and documented only by a skull. Finally there is group 6, a series of which were collected from the same locality as a series of group 5.

VARIATION OF OTHER CHARACTERS

Basis

The states of other characters of members of the six groups thus defined were examined to determine how many of them supported these groupings (Table 1). The possibility that the groups could be further subdivided on the basis of these characters was also examined. No grounds for further subdivision were found. The intergroup differences in these characters are discussed below.

Sexual Dimorphism

Sexual dimorphism was noted in several characters of most groups (the sample size for *A. drummondhayi* [3] was too small to arrive at a decision). Dimorphism is expressed by absolutely larger females which may have a greater number of ventrals and shorter relative tail length, whereas males may have a greater number of subcaudals (Tables 2). Group 1 (*A. brachyorrhos*) is the only one in which the ventrals show clear-cut sexual dimorphism. Although ventral counts may show some sexual dimorphism in group 5 (*A. trachyprocta*), male and female ranges overlap substantially. Group 1 (*A. brachyorrhos*) shows some sexual dimorphism in the number of subcaudals, while the values for groups 2, 4, 5 and 6 (*A. copei*, *A. guentheri*, *A. trachyprocta*, and *A. deraniyagalae*) suggest clear cut dimorphism in this character. The data from the specimens sexed suggest that females have relatively shorter tails in all groups. They also suggest that in all groups, except 5 (*A. trachyprocta*), the females are larger; in the latter group there is no sexual dimorphism in body length. The variably expressed spines on the lateral scales of the cloacal region of some species are more obvious in males.

Numbers of Ventrals (Fig. 2)

Fig. 2 shows the numbers of ventrals for the six groups. It indicates that the ranking of groups is 4, 3, 6, 2, 5, 1 (*A. guentheri*, *A. drummondhayi*, *A. deraniyagalae*, *A. copei*, *A. trachyprocta*, and *A. brachyorrhos*) in order of increasing number of ventral scales. While there may be differences in the means for the available specimens of each group, the ranges of the first three overlap broadly, as do those of the last three. More substantial differences in ventral counts are found if only males or females are separated for comparison among groups.



Fig. 2.—Frequency histogram of the number of ventrals (left) and subcaudals (right) for the specimens of *Aspidura* examined. From top to bottom: *A. brachyorrhos*, *A. copei*, *A. deraniyagalae*, *A. drummondhayi*, *A. guentheri*, *A. trachyprocta*. Maximum vertical value equals 16, horizontal divisions equal to one.

Numbers of Subcaudals (Fig. 2)

Groups 6, 3, and 5 (*A. deraniyagalae*, *A. drummondhayi*, and *A. trachyprocta*) have the lowest numbers of subcaudals; group 4 (*A. guentheri*) has slightly more. Groups 1 and 2 (*A. brachyorrhos* and *A. copei*) have somewhat higher counts; however, the figure illustrates substantial overlap among groups with females of group 2 (*A. copei*) having much lower numbers of subcaudals than males. The male and female samples occupy the higher and lower portions of the ranges, respectively, for each of the groups. The differences among groups become more obvious when the sexes are compared separately.

Cloacal Spines

In group 5 (*A. trachyprocta*) the lateral scales of the cloacal region usually bear obvious spines. In groups 1, 2, 3, and 6 (*A. brachyorrhos*, *A. copei*, *A. drummondhayi*, and *A. deraniyagalae*) there is some evidence of spines. In group 4 (*A. guentheri*) spines are absent.

Body Proportions (Fig. 3)

The groups show marked differences in body length. Group 4 (*A. guentheri*) is by far the shortest, followed by groups 6 and 3 (*A. deraniyagalae* and *A. drummondhayi*). Groups 1 and 5 (*A. brachyorrhos* and *A. trachyprocta*) are substantially longer, with the latter showing a few larger individuals than the former. Group 2 (*A. copei*) is apparently the longest (and stoutest) based on the available specimens and literature records (Müller, 1887; Willey, 1906; Wall, 1923a).

The analysis of body diameter is complicated by such conditions as the presence of food in the gut and nutritional state; also, the body diameter increases during pregnancy. However, one can discern some slight intergroup differences in body diameter. Group 4 (*A. guentheri*) specimens are clearly more slender than those of group 6 (*A. deraniyagalae*) and perhaps group 3 (*A. drummondhayi*). Even adult specimens of group 4 (*A. guentheri*) show almost no overlap in size with specimens of groups 1 (*A. brachyorrhos*) and 3 (*A. drummondhayi*). The large sample of group 5 (*A. trachyprocta*) shows great variability and overlaps the ranges of the other groups.

While tail length shows considerable variability, the tails of groups 1 (*A. brachyorrhos*) and 2 (*A. copei*) appear relatively longer than those of the other groups.

Color Pattern

The coloration is highly variable. There is never any concordance between color pattern and scale pattern. The ground colors are shades

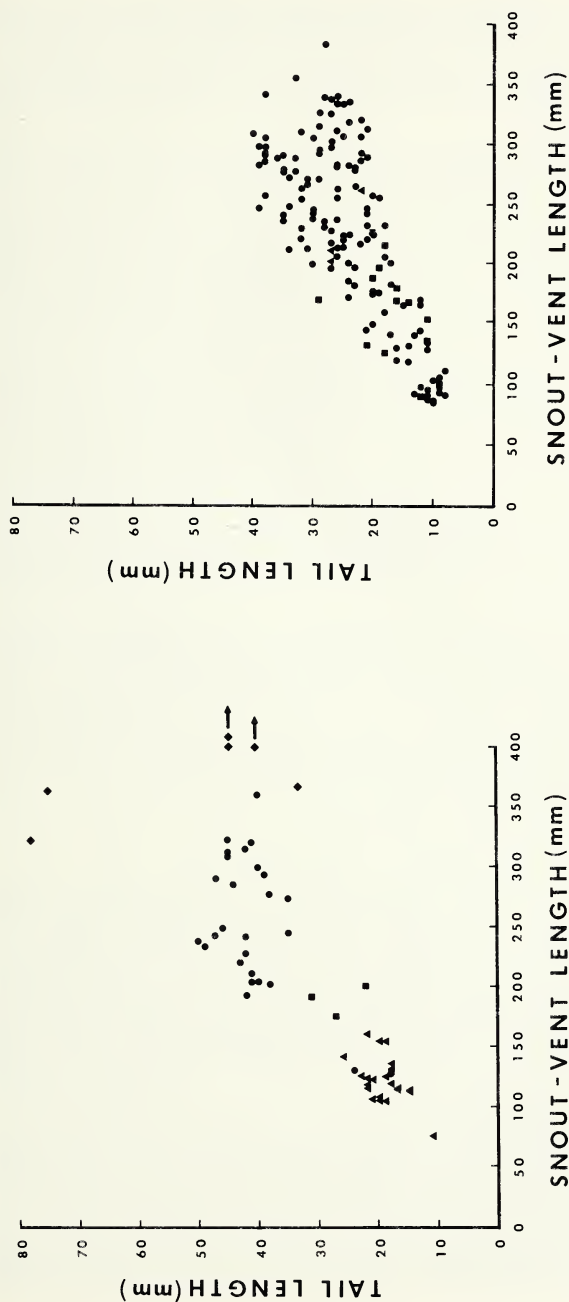


Fig. 3.—Scatter diagrams of snout vent length (abscissa) versus tail length (ordinate) of six species of *Aspidura*. Left figure for *A. quenherti* (triangle), *A. drummondhayi* (square), *A. brachyrrhos* (dot), *A. copei* (diamond). Right figure for *A. deraniyagala* (square) and *A. trachyprocta* (single specimen, dot; two specimens, triangle). The arrows adjacent to diamonds indicate large specimens of *A. copei* with snout vent lengths greater than 400 mm. The two specimens with tail lengths of 45 mm have snout vent lengths of 430 mm and 524 mm. The specimen with a tail length of 40 mm has a snout vent length of 450 mm.

of beige, dark brown, or light tan, all appearing mottled under the dissecting microscope. The head often shows a stripe that parallels the canthus rostralis. Groups 1, 2, and 4 (*A. brachyorrhos*, *A. copei*, and *A. guentheri*) have a light collar extending down the side of the head behind the eye.

When the dorsal color is light enough, a series of dorsal spots may be visible; these occur as a single vertebral row, a pair of rows, one on each side of the midline or a combination of these. Such spots often fuse into a single stripe at the level of the cloaca which extends onto the tail. These dorsal spots are generally about the size of one scale except in group 2 (*A. copei*), in which their area is that of approximately four scales. In groups 1, 2, 4, and 6 (*A. brachyorrhos*, *A. copei*, *A. guentheri*, and *A. deraniyagalae*), the area anterior and posterior to the spots is countershaded by light markings. Specimens of groups 3 and 6 (*A. drummondhayi* and *A. deraniyagalae*) may have a one scale wide vertebral stripe. Groups 3, 5, and 6 (*A. drummondhayi*, *A. trachyprocta*, and *A. deraniyagalae*) have lateral stripes also approximately one scale wide; these stripes are normally arranged between the second and third rows of dorsals on each side and extend from the region of the neck onto the tail, where they tend to lie one scale row above the subcaudals.

The ventral surface may show a suffused even color or a mossy blotching (that is, the pigmentation will then be produced by very large melanocytes, the processes of which are most obvious when the cells are dispersed on a lighter background). The ventral surface may also show very irregular, bold blotches that are generally placed midventrally. The pigmentation is almost always darker posteriorly and darkest on the ventral surface of the tail.

RELATIONSHIPS OF THE GROUPS

Group 2 (*A. copei*) is clearly distinct from the other groups. While there are few acceptable locality data, the animals in group 2 are much larger (Fig. 3 and Willey, 1906; Wall, 1923a) and show a color pattern of large bold spots that is strikingly distinct from that of all other groups. Four specimens of group 2 (Boulenger, 1904, now represented only by a skull in the BM) had the same locality label as the type-specimen of group 3 (*A. drummondhayi*), further supporting recognition of group 2 as a distinct species.

A second discrete assemblage is group 4 (*A. guentheri*), known from lowland forest localities in the southern portion of the island. Reliable literature records document the occurrence of the group in southeastern forests. Early literature comments about a restriction to coastal localities are in error. The animals are far smaller than are those of the other species and differ from all other forms in having a more wedge-

shaped and pointed head. They are also unique in their uniform beige ventral color and the sharply defined nuchal band.

The next assemblage is group 3 (*A. drummondhayi*) from the southern highlands (800+ m), which on the basis of available data is allopatric to all forms except group 2 (*A. copei*) (Boulenger, 1904). Its range adjoins the range of group 4 (*A. guentheri*) near Deniyaya.

Groups 1, 5, and 6 (*A. brachyorrhos*, *A. trachyprocta*, and *A. deraniyagalae*) are sympatric or parapatric in various combinations. Group 1 (*A. brachyorrhos*) ranges from Gammaduwa in the north to the vicinity of Namunukula in the south. All documented specimens were taken between 350 and 900 m (with the exception of two localities documented by museum specimens). Group 5 (*A. trachyprocta*) occurs between 750 and 2100 m and is sympatric with group 1 (*A. brachyorrhos*) at Gammaduwa, Namunukula, and Pundaluoya. The third assemblage is group 6 (*A. deraniyagalae*), known only from localities above 1000 m at Namunukula, at one of which it is definitely sympatric with group 5 (*A. trachyprocta*).

Group 1 (*A. brachyorrhos*) is clearly distinct from groups 5 (*A. trachyprocta*) and 6 (*A. deraniyagalae*) in numerous morphologic characters. Group 1 has the highest number of ventrals and of caudals and is the only species showing sexual dimorphism in the former character. Its color pattern is much lighter than that of the other two and shows a distinct single row of vertebral spots. These color pattern characteristics also serve to distinguish group 1 from the allopatric group 3 (*A. drummondhayi*).

A decision about the relationships of groups 5 (*A. trachyprocta*) and 6 (*A. deraniyagalae*) and perhaps group 3 (*A. drummondhayi*) is necessary. Groups 3 and 5 are apparently allopatric. However, the intermediate zone has been inadequately collected. Group 3 is more uniformly darkly pigmented, with a dorsal stripe instead of the spots usually present in group 5. While members of group 5 may be as dark as group 3, they always retain a light-colored, rather than a dark ventral surface. The numbers of ventrals and subcaudals are similar. Group 3 lacks a preocular, which is present in group 5. The subcaudals are divided in group 3 and azygous in group 5. These scale characteristics are constant and do not vary within either group. In the absence of clearly intermediate specimens, these two groups are retained as distinct species.

Finally there is group 6, sympatric with group 5 near Namunukula where the latter reaches the lower portion of its elevational range. They differ from each other in the number of dorsal scale rows (5, 15; 6, 17), in the division of the subcaudals (5, azygous; 6, divided), in body proportions (5, larger; 6, smaller, Fig. 3) and in number of ventrals (5, 128 to 151; 6, 117 to 122). The pigmentation is superficially

similar with respect to the lateral stripes, the dorsal stripe on the tail, and head pigmentation, but group 6 differs in the more regular and parallel arrangement of two instead of three rows of dorsal spots which usually flank a broken middorsal stripe, and in its lighter dorsal ground color. The samples from the region of sympatry or parapatry are adequate and none of the specimens shows intermediacy.

Groups 3 (*A. drummondhayi*) and 6 (*A. deraniyagalae*), while easily identifiable, show substantial similarity in meristic characters. Groups 5 (*A. deraniyagalae*) and 6 (*A. trachyprocta*) are most similar in coloration.

The five groups for which we have acceptable locality data are either allopatric, or if parapatric their ranges overlap narrowly and are separated altitudinally in the zone of overlap. The most widely ranging groups are regularly observed in the tea plantations that extend over much of the mountain ranges and the eggs of *Aspidura* have been found in open areas immediately adjacent to zones of tea bushes. In some such areas the snakes prove to be extremely common. For example, one open zone just below Ambawela Station produced twenty-seven specimens during one hour and a half of collecting with the aid of three tea workers.

All of this suggests that local sympatry of several species may be a recent phenomenon in species that have become associated with open tea areas. There is a possibility that ranges have shifted in time as some of the older literature records show greater range overlap between species than do present records with better documentation. Groups 5 and 6 occupy a zone in the vicinity of Namunukula, that is now almost entirely planted in tea, interrupted only by patches of the original forest along some hill crests, and small grassy areas beneath cliffs and around the gardens adjacent to workers' dwellings. The region around Namunukula has also produced a number of specimens of *Haplocercus ceylonensis* (which is remarkably similar to *Aspidura*) and of two species of uropeltids. Thus long term tropical monoculture of tea bushes seems to support a substantial number and species diversity of snakes feeding on earthworms and invertebrates.

ATTRIBUTION OF NAMES

The oldest available name is *Scytale brachyorrhos* Boie (1827:517) based on plate 22 (25 *per* Schlegel, 1837) of the unpublished manuscript of a "Érpetologie de Java" (Boie, ms, parts still preserved in the Leiden Museum). The description mentions a single frontal, refers to middorsal brown spots on a rust-colored dorsal surface and 143 (145 in Boie, ms) ventrals plus 28 caudals. The form was made the type-species of the new genus *Aspidura* by Wagler (1830). In 1831 Boie (also reprinted in Susanna, 1834) wrote that the type, which had ap-

parently been obtained by a Mr. Drapiez, did not come from Java, but from Ceylon. The 1827 publication did not list the location of the type, but Boie's manuscript notes indicate that it was in the "Mus. Bruxelles," that is, in Brussels (rather than Paris, as assumed by later authors). The holotype appears to have been lost, as there are no records in Brussels or Tervuren, but the description and illustration of head scales including mention that the prefrontal was excluded from the orbit fits the diagnosis of our group 1; however, the middorsal spots mentioned in the text are illustrated as a broken middorsal line. The name is here assigned to group 1.

Schlegel (1837:42) noted that "*brachorrhos*" came from the Philippines or Ceylon (see also Duméril and Bibron, 1854), placed it in the genus *Calamaria*, and assigned the new specific name *C. scytale* derived from the generic name. He referred to two specimens assumed by all later authors (see Duméril and Bibron, 1854) to have been the types of *S. brachyorrhos*. These (MHNP 1322, 7214; labelled as from the Philippines and collected by Leschenault) are now in the Paris Natural History Museum and were examined for comparison. They appear to be typical examples of group 1, show the color pattern mentioned in the description and agree with the other characteristics of the form. One specimen (MNHP 1322) has three (rather than two) postoculars on the left side of the head, whereas the other one has only a single postocular on the right. The number of ventral scales of the former specimen agrees well with the original description; however, a portion of its tail appears to have been removed as it only retains 13 subcaudals. The tail of the second specimen also shows damage. The name *scytale* is thus a junior synonym of *brachyorrhos*.

The second name available for the group is *Aspidura trachyprocta* Cope (1860). It was based on a single specimen (ANSP 3308) collected in "Ceylon" by Mr. Cuming (M. Cumming in the catalog). The holotype was examined as part of the present study. The description, which mentions the more uniform dorsal coloration and ventral patching, and notes that the peculiar tuberculation of the "ischadic region" is of assistance to the animals for burrowing in the earth, is in good agreement with the specimen. The faded dorsal color of the type-specimen shows the series of spots typical for this form. The value reported for the ventral count is low, which suggests that the count was not started immediately posterior to the chin shields. The presence of 15 scale rows, undivided subcaudals, and agreement in details of head scalation leave no doubt that this name pertains to group 5.

The third name in the genus is *Aspidura copei* Günther (1864) based on a single specimen (BM 1946.1.12.9) purchased by the British Museum, without locality but assumed to have been obtained from Ceylon. The details of color pattern, scalation, and body proportions in

the description are in good agreement with the type-specimen. The only significant difference is that Günther considered the postorbitals to be subequal, whereas we find the upper to be somewhat smaller. The name appears to pertain to group 2.

The fourth name in the genus is *Aspidura guentheri* Ferguson (1876), which was based on a series of 12 specimens, 11 of which are now in the British Museum (BM 1946.1.12.16–1946.1.12.26) while the twelfth specimen is in the Museum of Comparative Zoology (MCZ 28467). Unfortunately these lack more specific locality than “Ceylon,” though Ferguson in his diagnosis notes that “*A. guentheri* occurs close to the coast and never far from it.” The counts given in the description are in good agreement with the type specimens examined and the name pertains to group 4.

The fifth name in the genus is *Aspidura drummondhayi* Boulenger (1904) based on two specimens (BM 1946.1.12.45–1946.1.12.46, labelled “Hopeville” estate) collected “by H. M. Drummond-Hay during March, April, and May 1903” at elevations between 3500 to 4200 ft on the Hopewell estate, Balangoda, Ceylon. This was the first Sri Lankan *Aspidura* species to be described from a specific locality. The description notes the occurrence of 15 rows of dorsal scales and is in good agreement with the type specimen examined. The name clearly pertains to group 3. This needs to be stressed, as subsequent authors (Smith, 1943; Taylor, 1950) have used the name for specimens with 17 rows without noting that the type-specimens have only 15 rows.

There being no other available names for species of this assemblage, we take pleasure in naming the new species, group 6, for Dr. P. E. P. Deraniyagala.

KEY TO THE SPECIES OF THE GENUS *ASPIDURA* (See Fig. 4)

1. Dorsal scales in 15 rows 2
Dorsal scales in 17 rows 3
2. Preocular present, subcaudals undivided *A. trachyprocta*
Preocular absent, all or some subcaudals divided *A. drummondhayi*
3. Preocular absent *A. copei*
Preocular present 4
4. Posterior subcaudals divided *A. deraniyagalae*.
All subcaudals undivided 5
5. Prefrontal excluded from orbit *A. brachyorrhos*
Prefrontal contacts orbit *A. guentheri*

SYSTEMATIC ACCOUNTS

Aspidura brachyorrhos (Boie)

Scytale brachyorrhos F. Boie, 1827:517 (plate 22 of Boie, ms). Type-locality: “Java” (=Ceylon, per Boie, 1831; Susanna, 1834; here restricted to Sri Lanka). Holotype: Brussels Museum, apparently lost.

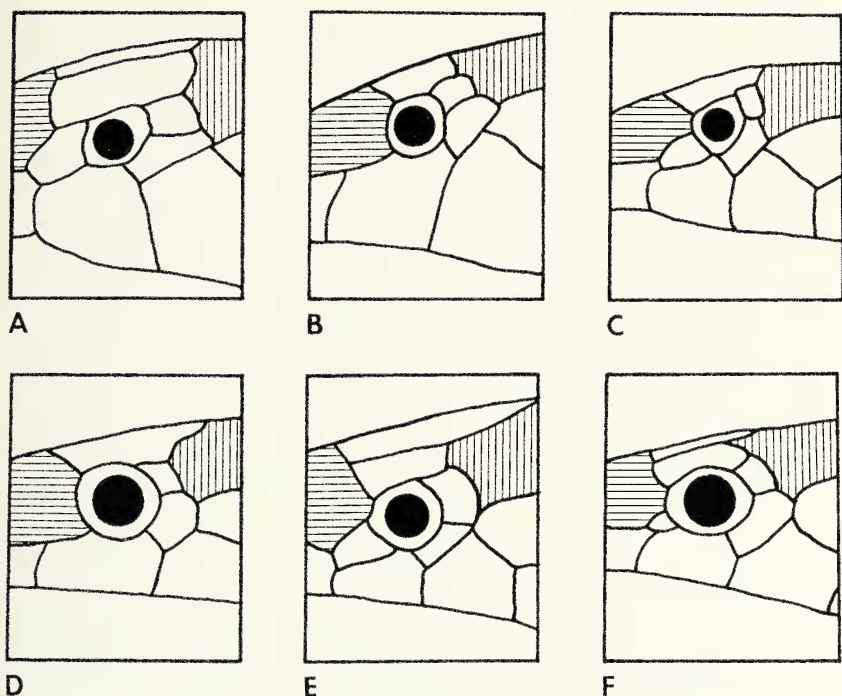


Fig. 4.—A) *Aspidura brachyorrhos*; B) *A. copei*; C) *A. deraniyagalae*; D) *A. drummond-hayi*; E) *A. guentheri*; F) *A. trachyprocta*. Lateral view of head to show the scales around the orbit. Anterior to left. The horizontally hatched scale is the prefrontal and the vertically hatched one the parietal. Other scales shown are the supralabials, preoculars, postoculars, supraoculars, and (sometimes) the frontal.

Calamaria scytale Schlegel, 1837:42. Switch of generic to specific name. Type-locality: Philippines or Ceylon?? Syntypes: MNHP 1322, 7214.

Aspidura brachyorrhos: Taylor, 1953:1620. Erroneous emendation.

Diagnosis.—This species of *Aspidura* is characterized by having a preocular scale; a prefrontal scale that is excluded from the orbit by the preocular scale and contacts supralabials two and three; a lower postocular longer than the upper; both postoculars in contact with the parietal scale; and the anterior pair of chin shields two to three times the length of the posterior pair.

Seventeen dorsal scale rows are present along the body. The ventral counts range from 134 to 159 (mean = 146.07 ± 2.58 , $N = 29$) and those of subcaudals from 25 to 39 (mean = 31.37 ± 1.27 , $N = 27$). The subcaudals are undivided. Snout-vent lengths range from 128 mm to 360 mm, tail lengths from 18 mm to 50 mm, midbody diameters from

4 mm to 9.8 mm (Table 2). Females are larger and have more ventrals than do males. There are no obvious differences in the caudal counts of males and females. Fig. 2 compares the major counts, Fig. 3 the body proportions, and Figs. 5, 8, and 10 illustrate specimens.

Color pattern (preserved specimens).—The ground color is light brown dorsally and a clear, sometimes mottled beige ventrally. The undersurface of the tail is often darkened. None of the pattern elements are sharply defined nor do they correlate with scale geometry. The dorsal surface of the body shows a lightened vertebral stripe about one scale wide in which lie middorsal dark spots approximately five scales apart. A dark stripe runs along each side, from neck to tail, on the level of the second and third dorsal scale rows. In some specimens the stripe also occupies the first dorsal scale row. On the tail it becomes darker and may occupy most of the first and second scale rows. The two dorsal scale rows above the lateral stripe are usually lightened. An irregular, wide (and interrupted) dark neck band is present immediately behind the parietals, and reaches ventrally to the level of the third dorsal row where it is continuous with the lateral stripe.

The snout is covered with variable dark blotches. The side of the head, from rostral, prefrontal, and preocular onto the first temporal, is covered by a zone of dark pigmentation that variably extends toward the lip along the intersupralabial sutures. This lateral dark zone is limited posteriorly by a light zone just posterior to the last supralabials that ascends to the level of the parietals. Posterior extensions of the light zone interrupt the dark nuchal band to form a medial, diamond-shaped blotch flanked by two dark rectangles extending ventrally to the third dorsal row (see Fig. 5). The entire dorsal surface of the snout may be darkened so that the individual blotches are less apparent.

The dorsal ground color appears mottled. The lightened middorsal stripe is discontinuous; being formed by a non-mottled zone lying just anterior and posterior (but not lateral) to the middorsal dark spots. Two lateral rows of dark spots (on dorsal scale row five on each side), not aligned with the middorsal ones, may flank them on the anterior portion of the back.

These spots tend to be irregularly spaced, occur only on some specimens, and fade out posteriorly. The ventral surface may be almost completely pale; however, concentrations of dark pigment may occur along the sutures. In other specimens the ventral pigmentation is much stronger overall with a mossy blotching extending irregularly over the ventral surface. In pale specimens a marked darkening and increase in blotching is present in the subcaudal region. In heavily pigmented specimens the subcaudal zone may be almost completely dark.

Color in life.—Living animals are a rich brown orange with a clear venter (see Gans, 1975:117, for a color photograph of a specimen mis-

Table 2.—Morphological data for six species of *Aspidura* from Sri Lanka. Key to the table is as follows: (M) or (F) after the specimen number indicate male and female, respectively; (A) preocular condition—+ = present, - = absent (right side/left side); (B) prefrontal condition—+ = contacting orbit, - = not contacting orbit; (C) relative postocular sizes—+ = upper postocular larger, - = lower postocular larger, 0 = postoculars subequal in size (numbers indicating the number of postoculars replace these symbols where the number of postoculars differs from the usual two); (D) number of postoculars contacting parietal scale (right/left side); (E) subcaudal condition—+ = all subcaudals divided, - = subcaudals undivided, +/- = posterior subcaudals divided; (F) additional dorsal scale rows near head—+, # = present to the ventral scale given, - = absent; (G) cloacal spines—+ = present, - = absent, S = slightly developed, M = medium development, W = well developed.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
<i>Aspidura brachyorrhos</i>										
MNHP 1322	143 + ? (cut)	17/17/17	276 + ? (cut)/6	+/+	-/-	-/3	2/3	-	-	+S
MNHP 7214	152 + 25	17/17/17	360 + 40/8.8	+/+	-/-	1/-	1/2	-	-	-
ANSP 3309	154 + 32	17/17/17	285 + 44/7.7	+/+	-/-	-/-	1/1	-	-	-
CM 83446 (F)	154 + 31	17/17/17	322 + 45/8.5	+/+	-/-	-/-	1/2	-	-	-
CM 83447	159 + 33	17/17/17	128 + 18/4	+/+	-/-	1/1	1/1	-	?	?
MCZ 4236	151 + 33	17/17/17	312 + 45	+/+	-/-	1/1	1/1	-	?	?
MNHP 1331	156 + 32	17/17/17	314 + 42/8.8	+/+	-/-	-/-	2/2	-	-	-
CM 83448 (F)	152 + cut	17/17/17	285 + cut/8.9	+/+	-/-	-/1	2/1	-	-	-
AMNH 120244	154 + 26	17/17/17	277 + 38/9.1	+/+	-/-	-/-	2/2	-	-	-
AL 105a	153 + 26	17/17/17	273 + 35/7	+/+	-/-	-/-	2/2	-	-	-
AL 105b	142 + 32	17/17/17	204 + 40/7	+/+	-/-	-/-	2/2	-	-	+S
CM 83449 (M)	138 + 33	17/17/17	220 + 43/5.9	+/+	-/-	-/-	2/2	-	-	-
AMNH 99392	141 + 35	17/17/17	243 + 47/6	+/+	+/+	-/-	2/2	+/-	-	?
CM 83450 (M)	136 + 36	17/17/17	130 + 24/5.3	+/+	-/-	-/-	2/2	-	-	-
CM 83454 (F)	153 + 28	17/17/17	320 + 41/8.1	+/+	-/-	-/-	2/2	-	-	-
USNM 225075	150 + 29	17/17/17	308 + 45/7.8	+/+	-/-	+/+	1/2	-	-	-
USNM 225076 (M)	141 + 33	17/17/17	204 + 41/7.3	+/+	-/-	-/-	2/2	-	-	-
USNM 225077 (F)	149 + 33	17/17/17	290 + 47/7.2	+/+	-/-	-/-	2/2	-	-	-
FMNH 167005	141 + 35	17/17/17	195 + 42/5.5	+/+	-/-	-/-	2/2	-	-	-
MCZ 39817	148 + 32	?	245 + 35	+/+	-/-	1/-	1/2	?	?	?

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
MCZ 39818	145 + 39	17/17/17	238 + 50	++	-/-	1/-	1/2	-	?	?
CM 83451 (F)	145 + 28	17/17/17	293 + 39/9.8	++	-/-	-/-	2/1	-	-	-
CM 83452 (M)	138 + 31	17/17/17	202 + 38/7	++	+/-	0/-	2/2	-	-	+S
AMNH 120245 (M)	140 + 31	17/17/17	228 + 42/6.4	++	-/-	-/-	2/2	-	-	-
FMNH 120911	140 + 31	17/17/17	211 + 41/5.7	++	-/-	-/-	2/2	-	-	-
FMNH 178418	149 + 26	17/17/17	296 + 40/9	++	-/-	-/-	2/2	-	-	-
FMNH 125015	142 + 33	17/17/17	248 + 46/8.5	++	-/-	-/-	2/2	-	-	+S
CM 83453 (M)	136 + 31	17/17/17	241 + 42/9.1	++	-/-	-/-	2/2	-	-	+S
FMNH 142405	134 + 33	17/17/17	232 + 49/7	++	-/-	-/-	2/2	-	-	-
<i>Aspidura copei</i>										
BM 1946.1.12.9 (M)	126 + 35	17/17/17	364 + 75/13.5	-/-	+/+	-/-	2/2	-	-	+M
BM 1931.5.13.60 (M)	128 + 32	17/17/17	265 + 7/5.5	-/-	+/+	-/-	2/2	-	-	-
BM 1946.4.29.216 (F)	131 + 19	17/17/17	365 + 33/15	-/-	+/+	-/-	2/2	-	-	-
NMB 928 (F)	128 + 15	17/15/15	430 + 45/15	-/-	+/+	-/-	2/2	+/-	-	-
ZMH R01577	131 + 16	17/17/17	524 + 45/25	-/-	+/+	-/-	2/2	-	-	-
ZMH R01578	123 + 34	17/17/17	325 + 78/12	-/-	+/+	-/-	2/2	-	-	+S
ZMH R01579	137 + 17	17/17/17	450 + 40/15	-/-	+/+	-/-	2/2	-	-	-
<i>Aspidura deraniyagallae</i>										
CM 83455 (M)	122 + 25	17/17/17	170 + 29/7.9	++	+/+	-/-	2/2	+/-	-	+M
CM 83456	119 + 13	17/17/17	180 + 16/6.8	++	+/+	-/-	2/2	+/-	-	-
AMNH 120246 (M)	120 + 25	17/17/17	132 + 21/5.3	++	+/+	-/-	2/2	+/-	-	+M
CM 83457 (M)	119 + 26	17/17/17	90 + 12/3.9	++	+/+	-/-	2/2	+/-	-	-
CM 83458 (F)	120 + 16	17/17/17	226 + 20/8.6	++	+/+	-/-	2/2	+/-	-	-
USNM 225091 (F)	120 + 14	17/17/17	154 + 11/7.7	++	+/+	-/-	2/2	+/-	-	-
USNM 225092	117 + 15	17/17/17	136 + 11/6.9	++	+/+	-/-	2/2	+/-	-	-
USNM 225093	119 + 14	17/17/17	168 + 14/7.9	++	+/+	-/-	2/2	+/-	-	-
USNM 225094	122 + 15	17/17/17	169 + 16/10	++	+/+	-/-	2/2	+/-	-	-
CM 83459 (F)	120 + 15	17/17/17	188 + 20/10.7	++	+/+	-/-	2/2	+/-	-	-

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
CM 83460 (F)	120 + 15	17/17/17	197 + 19/8	+/+	+/+	-/-	2/2	+/-	-	-
CM 83461 (F)	120 + 14	17/17/17	215 + 18/11.5	+/+	+/+	-/-	2/2	+/-	-	-
CM 83462 (M)	121 + 24	17/17/17	126 + 18/6.7	+/+	+/+	-/-	2/2	+/-	-	+S
<i>Aspidura drummondhayi</i>										
BM 1946.1.12.45	113 + 26	15/15/15	175 + 27/6.5	-/-	+/+	-/-	2/2	+/-	+7	+S
BM 1946.1.12.46	118 + 18	15/15/15	192 + 31/6	-/-	+/+	-/-	2/2	+	?	-
CM 83467	119 + 18	15/15/15	200 + 22/7	-/-	+/+	-/-	2/2	+	?	-
<i>Aspidura guentheri</i>										
AMNH 120247 (F)	122 + 23	17/17/17	131 + 18/5	+/+	+/+	+1	1/1	-	-	-
CM 83463 (M)	117 + 29	17/17/17	105 + 20/4.2	+/+	+/+	+/+	1/1	-	-	-
MCZ 15803	108 + 24	17/17/17	125 + 19	+/+	+/+	+/+	1/1	?	?	?
BM 1946.1.12.16	113 + 19	17/17/17	130 + 18/4.7	+/+	+/+	0/0	1/1	-	-	-
BM 1946.1.12.17	105 + 24	17/17/17	115 + 22/4	+/+	+/+	0/0	1/1	-	-	-
BM 1946.1.12.18	108 + 24	17/17/17	122 + 21/4.6	+/+	+/+	0/0	1/1	-	-	-
BM 1946.1.12.19	116 + 19	17/17/17	135 + 18/4.2	+/+	+/+	0/0	1/1	-	-	-
BM 1946.1.12.20	106 + 25	17/16/15	118 + 22/4.2	+/+	+/+	0/+	1/1	-	-	-
BM 1946.1.12.21	108 + 19	17/17/17	114 + 15/3.8	+/+	+/+	0/0	1/1	-	-	-
MCZ 28467	109 + 23	17/17/17	119 + 18	+/+	+/+	+/+	1/1	?	?	?
CM 83464 (M)	109 + 25	17/17/17	125 + 23/4	+/+	+/+	+/+	1/1	+/-	-	-
FMNH 172302	115 + 20	17/17/17	114 + 17/3.5	+/+	+/+	0/0	1/1	-	-	-
FMNH 172303	106 + 24	17/17/17	104 + 19/4.2	+/+	+/+	0/0	1/1	-	-	-
FMNH 172304	115 + 22	17/17/17	115 + 17/3.5	+/+	+/+	0/0	1/1	-	-	-
FMNH 172305	103 + 24	17/17/17	106 + 21/4.0	+/+	+/+	+/+	1/1	-	-	-
FMNH 172306	107 + 24	17/17/17	107 + 20/3.5	+/+	+/+	+/+	1/1	-	-	-
CM 83465	122 + 18	17/17/17	75 + 11/2.8	+/+	+/+	+/+	1/1	-	-	-
CM 83466 (F)	120 + 22	17/17/17	154 + 20/4	+/+	+/+	+/+	1/1	-	-	-
USNM 225078 (F)	122 + 19	17/17/17	154 + 19/5	+/+	+/+	+/+	1/1	-	-	-
USNM 225079 (F)	121 + 20	17/17/17	160 + 22/4	+/+	+/+	+/+	1/1	-	-	-

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
AMNH 104446	115 + 20	17/17/17	113 + 15/3.8	+/+	+/+	??	1/1	—	—	?
MCZ 18053	111 + 24	17/17/17	141 + 26	+/+	+/+	+/+	1/1	?	?	?
MCZ 18054	109 + 23	17/17/17	123 + 22	+/+	+/+	+/+	1/1	?	?	?
<i>Aspidura trachyprocta</i>										
CM 83486	130 + 25	15/15/15	236 + 35/6.7	+/+	+/+	-/-	2/2	—	+15	+W
AMNH 24671	148 + 15	15/15/15	383 + 28/12	+/+	+/+	-/-	2/2	—	+	?
ANSP 3308	141 + 21	15/15/15	214 + 25/8	-/-	+/+	-/-	2/2	—	+9	+M
FMNH 10901	143 + 20	15/15/15	237 + 26/6.5	+/+	+/+	-/-	2/2	—	+8	+W
FMNH 27264	145 + 24	15/15/15	263 + 32/8.2	+/+	+/+	-/-	2/2	—	+9	+W
FMNH 124118	135 + 12	15/15/15	232 + 18/8	+/+	+/+	-/-	2/2	—	+9	+S
FMNH 124119	141 + 19	15/15/15	288 + 33/7.9	+/+	+/+	-/-	2/2	+/-	+9	+W
MCZ 3174	121(?) + 24	15/15/15	?	+/+	+/+	0/0	2/2	+	?	?
MCZ 9304	136 + 24	15/15/15	290 + 35/11	+/+	+/+	-/-	2/2	—	?	?
USNM 19214	142 + 23	15/15/15	89 + ?/3	+/+	+/+	-/-	2/2	—	+	?
USNM 56150	144 + 16	15/15/15	339 + 28/10	+/+	+/+	-/-	2/2	+/-	+	?
CM 83468	137 + 20	15/15/15	95 + 11/4	+/+	+/+	-/-	2/2	—	+9	+S
FMNH 142404	139 + 26	15/15/15	282 + 39/9.8	+/+	+/+	-/-	2/2	—	+7	+W
CM 83536	141 + 15	15/15/15	144 + 12/6.2	+/+	+/+	-/-	2/2	—	+9	—
CM 83537	134 + 14	15/15/15	103 + 10/4.5	+/+	+/+	-/-	2/2	—	+7	—
CM 83538	137 + 23	15/15/15	98 + 12/5	+/+	+/+	-/-	2/2	—	+9	—
CM 83539	139 + 17	15/15/15	132 + 14/4.2	+/+	+/+	-/-	2/2	—	+10	—
USNM 225083	136 + 16	15/15/15	292 + 29/10	+/+	+/+	-/-	2/2	—	+6	+S
USNM 225084	138 + 24	15/15/15	176 + 19/4.8	+/+	+/+	-/-	2/2	—	+9	+M
USNM 225085 (M)	140 + 20	15/15/15	186 + 24/7	+/+	+/+	-/-	2/2	—	+8	+M
USNM 225086	139 + 16	15/15/15	283 + 26/9.6	+/+	+/+	-/-	2/2	—	+9	+S
USNM 225087	138 + 23	15/15/15	213 + 26/5.6	+/+	+/+	-/-	2/2	+	+13	+M
USNM 225088	137 + 24	15/15/15	141 + 17/5	+/+	+/+	-/-	2/2	—	+7	+S
USNM 225089	134 + 15	15/15/15	99 + 9/4.9	+/+	+/+	-/-	2/2	—	+9	+S
USNM 225090	142 + 13	15/15/15	111 + 8/4.9	+/+	+/+	-/-	2/2	—	+6	—

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scales	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
CM 83469	132 + 24	15/15/15	248 + 34/7.8	+/+	+/+	-/1	2/1	-	+9	+W
CM 83470	143 + 13	15/15/15	292 + 22/11.8	+/+	+/+	-/-	2/2	-	+9	+S
CM 83471	138 + 21	15/15/15	182 + 23/7.5	+/+	+/+	-/-	2/2	-	+12	+M
AMNH 120248	139 + 23	15/15/15	245 + 30/8.2	+/+	+/+	-/-	2/2	-	+11	+W
CM 83472	134 + 16	15/15/15	105 + 9/4.8	+/+	+/+	1	1	-	+8	-
CM 83473	136 + 16	15/15/15	183 + 17/8	+/+	+/+	-/-	2/2	-	+15	-
CM 83474	137 + 14	15/15/15	100 + 9/4.6	+/+	+/+	+1	2/1	-	+9	-
CM 83475	134 + 22	15/15/15	242 + 30/7	+/+	+/+	-/-	2/2	-	+5	+W
FMNH 121474	138 + 19	15/15/15	271 + 29/8.5	-/-	+/+	-/-	2/2	-	-	+W
FMNH 121475	137 + 25	15/15/15	298 + 39/9.3	+/+	+/+	-/-	2/2	-	+9	+W
FMNH 121476	139 + 19	15/15/15	271 + 31/8.2	+/+	+/+	-/-	2/2	-	+8	+W
FMNH 121477	Broken	15/15/15	Broken	+/+	+/+	-/-	2/2	-?	+7?	+S
FMNH 121478	137 + 15	15/15/15	282 + 24/8.7	+/+	+/+	-/-	2/2	-	+9	+S
FMNH 121479	144 + 13	15/15/15	325 + 27/9.9	+/+	+/+	-/-	2/2	-	+7	+S
CM 83476	145 + 23	15/15/15	228 + 27/8.3	-/-	+/+	-/-	2/2	-	-	+S
CM 83477	149 + 15	15/15/15	278 + 23/10.1	+/+	+/+	-/-	2/2	-	+6	+S
AMNH 94447	143 + 16	15/15/15	312 + 21/8	+/+	+/+	-/-	2/2	-	+	?
FMNH 131365	141 + 15	15/15/15	201 + 17/6.7	+/+	+/+	1/-	1/2	-	+11	+S
FMNH 131366	139 + 13	15/15/15	302 + 27/10.2	+/+	+/+	-/-	2/2	-	+9	+S
FMNH 131367	137 + 20	15/15/15	197 + 23/6.2	+/+	+/+	-/-	2/2	-	+9	+S
FMNH 131368	135 + 23	15/15/15	297 + 38/8	+/+	+/+	-/-	2/2	-	+9	+W
FMNH 131369	140 + 12	15/15/15	318 + 24/9	+/+	+/+	-/-	2/2	-	?	-
FMNH 131370	143 + 11	15/15/15	306 + 22/8.4	?/?	?/?	-/-	2/2	-	+9	-
F 82 (F)	148 + 16	15/15/15	326 + 29/9.3	+/+	+/+	-/-	1/2	-	+12	+S
F 83	143 + 14	15/15/15	306 + 25/8.2	+/+	+/+	-/-	2/2	-	+6	+S
F 84	143 + 22	15/15/15	341 + 38/10.8	+/+	+/+	-/-	2/2	-	+6	+W
CM 83478	151 + 13	15/15/15	334 + 26/9.1	+/+	+/+	-/-	2/2	-	+6	+S
CM 83479	142 + 11	15/15/15	335 + 24/9	+/+	+/+	-/-	2/2	-	+9	+S
CM 83480	149 + 12	15/15/15	166 + 12/5.2	+/+	+/+	-/-	2/2	-	+6	+S

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
CM 83481	144 + 20	15/15/15	160 + 18/4.6	+/+	+/+	-/-	2/2	-	+9	+S
CM 83482	144 + 24	15/15/15	241 + 35/7.7	+/+	+/+	-/-	2/2	-	+5	+W
FMNH 121947	139 + 12	15/15/15	340 + 26/10.5	+/+	+/+	-/-	2/2	-	+12	-
FMNH 121948	138 + 24	15/15/15	254 + 32/8	+/+	+/+	-/-	2/2	-	+7	+M
F 90	145 + 15	15/15/15	289 + 21/8.3	+/+	+/+	-/-	2/2	-	+7	-
F 91	148 + 22	15/15/15	272 + 34/10	+/+	+/+	1/1	1/1	-	+6	+W
F 92 (M)	139 + 19	15/15/15	224 + 25/6.4	+/+	+/+	-/-	2/2	-	+6	+W
CM 83487	143 + 16	15/15/15	206 + 18/5.3	+/+	+/+	-/-	2/2	-	+7	+S
CM 83488	144 + 23	15/15/15	279 + 35/8.9	+/+	+/+	-/-	2/2	-	+9	+W
CM 83489	133 + 21	15/15/15	285 + 38/10.4	+/+	+/+	-/-	2/2	-	+8	+W
CM 83490	142 + 20	15/15/15	178 + 20/5.9	+/+	+/+	-/-	2/2	-	+8	+S
CM 83491	139 + 22	15/15/15	211 + 27/6.8	+/+	+/+	-/-	2/2	-	+6	+S
CM 83492	144 + 22	15/15/15	238 + 30/6.8	+/+	+/+	-/-	2/2	-	+6	+M
CM 83493	142 + 20	15/15/15	220 + 25/6.6	+/+	+/+	-/-	2/2	-	+8	+M
CM 83494	140 + 14	15/15/15	265 + 23/8.2	+/+	+/+	-/-	2/2	-	+5	+S
CM 83495	146 + 13	15/15/15	255 + 19/7.6	+/+	+/+	-/-	2/2	-	+11	+S
CM 83496	136 + 23	15/15/15	206 + 26/7	+/+	+/+	-/-	2/2	-	+11	+S
CM 83497	141 + 24	15/15/15	211 + 27/6.5	+/+	+/+	-/-	2/2	-	+16	+W
CM 83498	144 + 15	15/15/15	257 + 20/6.5	+/+	+/+	-/-	2/2	-	+10	+S
CM 83483	139 + 23	15/15/15	276 + 35/11.2	+/+	+/+	-/-	2/2	-	+11	+W
CM 83484	140 + 25	15/15/15	230 + 32/9.4	+/+	+/+	-/-	2/2	-	+7	+W
CM 83485	135 + 23	15/15/15	288 + 36/9.2	+/+	+/+	-/-	2/2	-	+9	+W
CM 83500	134 + 15	15/15/15	262 + 26/8.5	+/+	+/+	-/-	2/2	-	+6	+M
CM 83501	137 + 22	15/15/15	292 + 38/8.6	+/+	+/+	-/-	2/2	-	+7	+W
CM 83502	140 + 21	15/15/15	277 + 33/7.8	+/+	+/+	-/-	2/2	-	+2	+W
CM 83503	136 + 20	15/15/15	231 + 28/7.5	+/+	+/+	-/-	2/2	-	+9	+W
CM 83504	137 + 13	15/15/15	261 + 22/7.8	+/+	+/+	-/-	2/2	-	+9	-
CM 83505	139 + 16	15/15/15	166 + 15/5	+/+	+/+	-/-	2/2	-	+9	+S
CM 83506	143 + 15	15/15/15	261 + 22/10.3	+/+	+/+	-/-	2/2	-	+10	+S

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
CM 83507	142 + 12	15/15/15	286 + 22/9	+/+	+/+	-/-	2/2	-	+5	+S
AMNH 85082	137 + 23	15/15/15	201 + 24/7	+/+	+/+	-/-	2/2	-	?	?
CM 83499	141 + 12	15/15/15	320 + 22/12.5	+/+	+/+	-/-	2/2	-	+7	+S
AMNH 85081	138 + 16	15/15/15	170 + 12/5.5	+/+	+/+	-/-	2/2	-	+	?
CM 83508 (M)	130 + 24	15/15/15	221 + 32/9.5	+/+	+/+	-/-	2/2	-	+7	+W
AMNH 120249 (M)	130 + 24	15/15/15	213 + 31/9.4	+/+	+/+	-/-	2/2	-	+7	+W
CM 83509	135 + 17	15/15/15	141 + 13/7.5	+/+	+/+	-/-	2/2	-	+6	-
CM 83510 (M)	131 + 25	15/15/15	212 + 34/8.8	+/+	+/+	-/-	2/2	-	+7	+W
CM 83511	128 + 25	15/15/15	196 + 27/8	+/+	+/+	-/-	2/2	-	+8	+W
CM 83512	133 + 14	15/15/15	281 + 26/12	+/+	+/+	-/-	2/2	-	+6	+S
CM 83513	134 + 25	15/15/15	172 + 24/8.6	+/+	+/+	-/-	2/2	-	+10	+S
CM 83514	135 + 17	15/15/15	217 + 22/9.1	+/+	+/+	-/-	2/2	-	+10	+S
CM 83515 (F)	137 + 16	15/15/15	246 + 21/10.6	+/+	+/+	-/-	2/2	-	+8	+S
CM 83516	133 + 16	15/15/15	98 + 9/4.2	+/+	+/+	-/-	2/2	-	+12	-
CM 83517	133 + 21	15/15/15	202 + 27/7.9	+/+	+/+	-/-	2/2	-	+4	+S
CM 83518	130 + 24	15/15/15	120 + 16/5.8	+/+	+/+	-/-	2/2	-	+12	+S
CM 83519 (F)	137 + 18	15/15/15	310 + 32/13.9	+/+	+/+	-/-	2/2	-	+8	+S
CM 83520	135 + 16	15/15/15	315 + 29/11.1	+/+	+/+	3/-	3/2	-	+9	+S
USNM 225080	133 + 25	15/15/15	257 + 38/11.1	+/+	+/+	-/-	2/2	-	+4	+W
USNM 225081	132 + 15	15/15/15	129 + 11/6.8	+/+	+/+	-/-	2/2	-	+9	-
USNM 225082	129 + 23	15/15/15	309 + 40/13.9	+/+	+/+	-/-	2/2	-	+4	+W
CM 83521 (M)	131 + 24	15/15/15	200 + 30/9.9	+/+	+/+	-/-	2/2	-	+9	+W
CM 83522 (F)	134 + 14	15/15/15	255 + 26/11	+/+	+/+	-/-	2/2	-	+4	+S
CM 83523	129 + 26	15/15/15	247 + 39/8.7	+/+	+/+	1/+	1/2	-	+8	+W
CM 83524	132 + 14	15/15/15	232 + 21/9.8	+/+	+/+	-/-	2/2	-	+12	+S
CM 83525	131 + 23	15/15/15	130 + 16/6.4	+/+	+/+	-/-	2/2	-	+12	+S
CM 83533	137 + 12	15/15/15	135 + 11/5.6	+/+	+/+	-/-	2/2	-	+10	+S
CM 83526	130 + 24	15/15/15	150 + 20/6.2	+/+	+/+	-/-	2/2	?	+7	?
CM 83527 (F)	130 + 17	15/15/15	305 + 30/12.4	+/+	+/+	-/-	2/2	-	+7	+S
CM 83528	135 + 18	15/15/15	295 + 29/11	+/+	+/?	-/-	2/2	-	+7	+S

Table 2.—Continued.

Museum, catalog nos., and sex	Vent + Caud Scutes	Head/Mid/Cloac Dorsals	S-V + Caud/Diam Dimensions	A	B	C	D	E	F	G
CM 83529	135 + 17	15/15/15	279 + 27/11	+/+	+/+	-/-	2/2	-	+9	+S
CM 83530 (M)	134 + 22	15/15/15	305 + 38/10	+/+	+/+	-/-	2/2	-	?	+W
CM 83531	133 + 12	15/15/15	333 + 25/11	+/+	+/+	-/-	2/2	-	+10	-
CM 83532 (M)	128 + 25	15/15/15	145 + 21/6.9	+/+	+/+	-/-	2/2	-	+11	+S
AMNH 120250	133 + cut	15/15/15	152 + cut/7	-/-	+/+	-/-	2/2	-	+7	+S
AMNH 120251	135 + cut	15/15/15	294 + cut/12	+/+	+/+	-/-	2/2	-	+7	+S
FMNH 120908	140 + 15	15/15/15	280 + 23/8.5	+/+	+/+	0/-	2/2	-	+8	-
FMNH 120909	132 + 15	15/15/15	225 + 20/8.2	+/+	+/+	-/-	2/2	-	+5	+S
FMNH 120910	145 + 15	15/15/15	255 + 24/9.1	+/+	+/+	1/1	1/1	-	+6	+S
FMNH 120912	138 + 22	15/15/15	293 + 38/9.4	+/+	+/+	-/-	2/2	-	+8	+W
MCZ 34890	138 + 14	15/15/15	93 + 9/3	+/+	+/+	-/-	2/2	-	+10	-
MCZ 34891	137 + 20	15/15/15	85 + 10/3	+/+	+/+	-/-	2/2	-	+7	+S
MCZ 34892	134 + 20	15/15/15	88 + 11/3	+/+	+/+	-/-	2/2	-	+7	+S
MCZ 34893	134 + 24	15/15/15	92 + 13/3	+/+	+/+	-/-	2/2	-	+8	+S
MCZ 34894	133 + 19	15/15/15	90 + 11/3	+/+	+/+	-/-	2/2	-	+7	+S
MCZ 34895	142 + 14	15/15/15	91 + 8/2.5	+/+	+/+	-/-	2/2	-	+11	-
MCZ 34896	135 + 19	15/15/15	86 + 10/3	+/+	+/+	-/-	2/2	-	+8	+S
MCZ 34897	132 + 20	15/15/15	214 + 25/7	+/+	+/+	-/-	2/2	-	+8	+W
MCZ 34898	137 + 23	15/15/15	235 + 28/7.5	+/+	+/+	-/-	2/2	-	+6	+M
MCZ 34899	134 + 21	15/15/15	175 + 20/5	+/+	+/+	1/-	1/2	-	+9	+M
MCZ 34900	129 + 21	15/15/15	119 + 14/4.5	+/+	+/+	-/-	2/2	-	+8	+S
MCZ 34901	134 + 23	15/15/15	202 + 27/7.3	+/+	+/+	-/-	2/2	-	+7	+M
MCZ 34902	132 + 20	15/15/15	218 + 27/7.5	+/+	+/+	-/-	2/2	-	+7	+M
MCZ 34903	136 + 15	15/15/15	221 + 21/7.2	+/+	+/+	-/-	2/2	-	+7	+S
MCZ 34904	134 + 21	15/15/15	266 + 31/9.8	+/+	+/+	-/-	2/2	-	+6	+W
MCZ 34905	132 + 13	15/15/15	242 + 21/7.2	+/+	+/+	1/-	1/2	-	+9	+S
MCZ 34906	144 + 14	15/15/15	311 + 26/8.4	+/+	+/+	-/-	2/2	-	+6	+S
MCZ 34907	136 + 15	15/15/15	355 + 33/10	+/+	+/+	-/-	2/2	+/-	+9	-
MCZ 34908	141 + 13	15/15/15	337 + 27/11.5	+/+	+/+	-/-	2/2	-	+11	+S

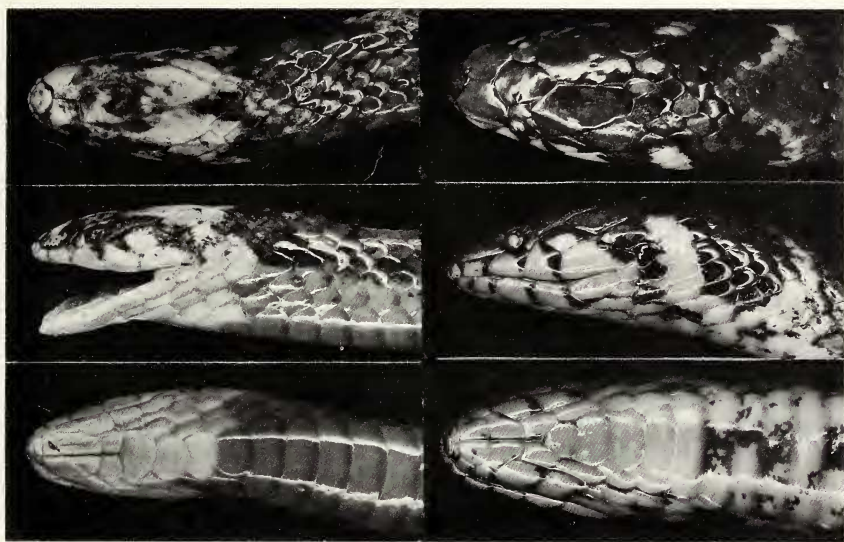


Fig. 5.—Dorsal, lateral, and ventral views of the head of (left) *Aspidura brachyrrhos* (MNHP 7214) and (right) *A. copei* (holotype BM 1946.1.12.9) to show scalation and color pattern.

labelled *A. trachyprocta*). The head is clearly dark brown, and the dorsal spots, neck band, and lateral line are apparent.

Locality records.—SRI LANKA: “Java” (=Ceylon, per F. Boie, 1831; Susanna, 1834), Brussels Museum, apparently lost (holotype of *Scytale brachyrrhos* F. Boie, 1827). “Philippines,” MHNP 1322, 7214 (syntypes of *Calamaria scytale* Schlegel, 1837; Dumeril and Bibron, 1854; Jan, 1862). No specific locality, (Theobald, 1876), ANSP 3309 (Cope, 1860), [Basel Museum, Müller, 1878], [Colombo Museum, Haly, 1886; de Silva, 1972], [Milan Museum, Jan, 1857; Jan and Sordelli, 1865, (13), pl. 2, 2], [“only in the mountains,” Günther, 1858(part); Boulenger, 1890, 1893], CM 83446–83447 (AL 648a–648b), MCZ 4236, MHNP 1331 (Günther, 1864), *ZSI 4423, 7024, 7026, 8390, 8392–8393. Gammaduwa, 750 m, CM 83448 (AL 103a), AMNH 120244 (AL 103b), AL 105a–105b; Pallatenne, 610 m, CM 83449 (AL 530); Matale, AMNH 99392; Weligalla, CM 83450 (AL 637); Kandy district, CM 83454 (AL 638a), *BNHS 1735 (Wall, 1921a); Peradeniya, *BM 1913.2.7.2, *ZMB 7269, *ZSI 16646 (Wall, 1921a); Gampola, 470 m, USNM 225075 (AL 288), USNM 225076 (AL 670b), USNM 225077 (AL 672); 30 mi (= 50 km) east of Colombo, *ZSI 7024 (Sclater, 1891); Medamaha Nuwara, FMNH 167005; Pundaluoya, 4000 ft, *BM 1905.3.25.91; Dimbulla, Queenswood Estate, MCZ 39817–39818; Hali Ela, CM 83451–83452 (AL 548a–548b), AMNH 120245 (AL 548c); Namunukula, Uva, FMNH 120911 (4000 ft, in trench), 178418; Tonacombe estate, Namunukula, *BM 1955.1.9.44–48 (4000 ft), *BM 1968.872 (3500 ft), FMNH 125015, *KU 31253 (is this Kansas Univ. 31238, in Taylor, 1953); Galapitikande, Namunukula, 4000 ft, *BM 1951.1.1.14–15; Devatura Rd. nr. Namunukula, CM 83453 (AL 66); Monaragala, Monaragala estate (3000 ft), FMNH 142405. [Velangoda, Kandy to the Horton Plains, absent from the Valimada (= Welimada?) area, Deraniyagala, 1955]. [Velangoda, Wall, 1921a], [Badulla, Pearlless, 1909].

Aspidura copei Günther

Aspidura copei Günther, 1864:203, plate 18E. Type-locality: Unknown, assumed to be "Ceylon." Holotype: BM 1946.1.12.9.

Diagnosis.—This species of *Aspidura* is characterized by the absence of a preocular scale; by a prefrontal scale that forms the entire anterior border of the orbit and contacts supralabials two, three and four; by having the lower postocular longer than the upper; both postoculars in contact with the parietal scale; and by two pairs of chin shields (three in the holotype).

Seventeen dorsal scale rows are present along the body (in NHMB 928 the count drops to 15 near midbody). The ventral counts range from 123 to 137 (mean = 129.14 ± 3.36 , $N = 7$) and those of the subcaudals from 15 to 35 (mean = 24 ± 6.93 , $N = 7$). The subcaudals are undivided. (The Basel specimen has three divided ones.) Snout-vent lengths range from 325 to 524, tail lengths from 33 to 78, and midbody diameter ranges from 5.5 to 25 mm (Table 2). Fig. 2 compares the major counts, Fig. 3 the body proportions, and Figs. 5, 8, and 10 illustrate specimens.

Color pattern (preserved specimens).—This is a boldly-marked species. Its pattern elements do not correlate with scale geometry. A brownish-olive middorsal band two to three scales wide is flanked on each side by a series (23 to 26 spots on each side) of solid dark blotches. Each blotch is two to three scales in width and length, and associated anteriorly and posteriorly with a slightly shorter light region. A brown ground color occupies the area between these light regions and extends ventrally to the second dorsal scale row. The sides of the body show another series of dark markings, each occupying two to four scales. These run into the ventrals and are not visible in dorsal view. The dorsal surface of the head is olive brown. The supra and infralabials are light yellow, with the sutures marked in black. A narrow dark band descends from the temporals, diagonally past the angle of the mouth, to the edge of the ventral surface.

A light middorsal spot marks the first middorsal scale posterior to the parietals. It is flanked by an olive area, ventral to which a narrow (one scale wide) light band extends diagonally posteriorly to join the light ventral region. The light spot is followed posteriorly by a large (three to four scale wide) dark, posteriorly-open V. The ventral arms of the V are darkest and extend to the level of the second dorsal on each side. The posterior edge of the V is lightly countershaded.

The ventral surface of the trunk is mottled. The dark pigmentation is mossy along the sides of the ventral scales and over the entire subcaudal surface. A series of more solidly-pigmented blotches proceeds

along the ventral midline; these are flanked by narrow irregular clear areas. The five most anterior ventral scales are unpigmented.

Under the dissecting microscope the dorsal surface of the snout is a solid olive except for a pair of light spots flanking the dorsal midline along the middle of the parietals. The dark rim of the eye is confluent with the dark band at the posterior end of the fourth supralabial. The first temporal is half black and half light. The ventralmost portions of the dark cephalic markings are much more solidly pigmented than the olive dorsal portions of the head.

Locality records.—SRI LANKA: No locality, BM 1946.1.12.9 (holotype of *A. copei* Günther, 1864; Boulenger, 1893; Theobald, 1876), BM 1931.5.13.60–61, NHMB 928 (Müller, 1887), [Colombo Museum, de Silva, 1972], ZMH R01577–R01579; District of Dimbola (=Dimbula), 4000–5000 ft, *BM 74.4.29.216 (Boulenger, 1890, 1893); [Hopewell Estate, Balangoda, Boulenger, 1904; Smith, 1943; Deraniyagala, 1955]; [Dickoya, Haly, 1886, Boulenger, 1890; Deraniyagala, 1955]; [Avisawella, Willey, 1906; this specimen appears slightly aberrant, and deserves reexamination]. [Pandalu Oya (=Pundaluoya), Deraniyagala, 1955].

Aspidura deraniyagalae, new species

Holotype.—CM 83455 (F 45), a male taken at Kanawarella Group Estate (near Namunukula), at 1520 m, August 1972, by Carl Gans.

Paratypes.—Other specimens listed under locality records; all from the vicinity of Namunukula, and near 1500 m elevation.

Diagnosis.—This species of *Aspidura* is characterized by having a preocular scale that forms a portion of the anterior border of the orbit; a prefrontal scale that forms the remaining portion of the anterior border of the orbit and contacts supralabials two and three; the lower postocular longer than the upper; both postoculars in contact with the parietal scale; and the anterior pair of the two pairs of chin shields one to two times the length of the posterior pair.

Seventeen dorsal scale rows are present along the body. The ventral counts range from 117 to 122 (mean = $119.92 \pm .73$, $N = 13$) and those of subcaudals from 13 to 26 (mean = 17.77 ± 2.82 , $N = 13$). The posterior subcaudals are divided. Snout–vent lengths range from 90 mm to 226 mm, tail lengths from 11 mm to 29 mm, midbody diameters from 3.9 mm to 10.7 mm (Table 2). Females have fewer caudals than males, shorter tails and larger bodies. Fig. 2 compares the major counts, Fig. 3 the body proportions and Figs. 6, 8, and 11 illustrate specimens.

Color pattern (preserved specimens).—The ground color is light beige to darker brown dorsally and blackish brown mottled on a lighter color, ventrally. The under surface of the tail is generally darkened. None of the pattern elements are sharply defined nor do they correlate with scale geometry. The dorsal surface of the body is more or less

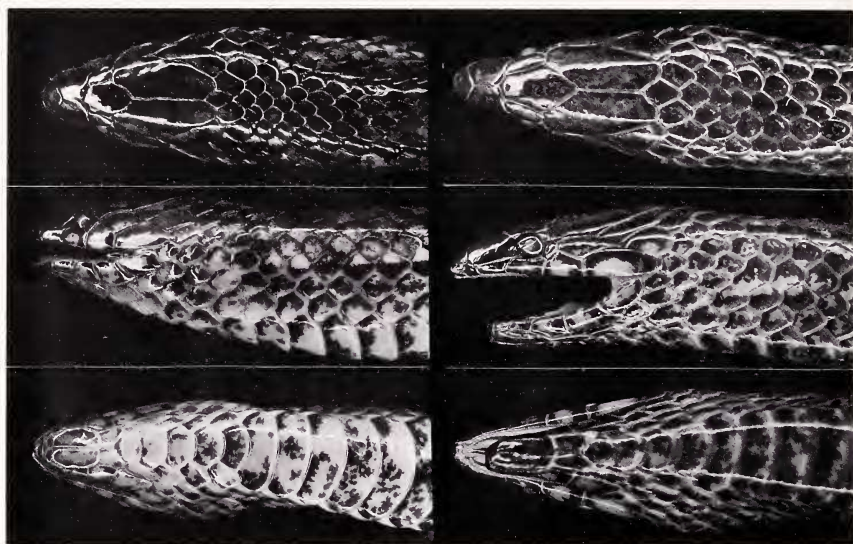


Fig. 6.—Dorsal, lateral, and ventral views of the head of (left) *Aspidura deraniyagalae* (holotype, CM 83455) and (right) *A. drummondhayi* (syntype BM 1946.1.12.45) to show scalation and color pattern.

uniformly colored; except for two paravertebral rows of dark spots on about dorsal scale row six which usually flank a narrow (less than one scale wide) broken middorsal stripe. Each spot is approximately one scale in size. In dark specimens, these spots are flanked on two sides by lighter regions. A dark stripe is present on the dorsal half of the second and ventral half of the third dorsal scale row on each side of the body. This lateral stripe is flanked dorsally by a half-scale wide light stripe and ventrally by a less distinct light stripe. These lateral stripes extend anteriorly to the level of the seventh ventral and are replaced there by a one to three scale long light area on each side. The dark lateral bands are obvious on the tail to its tip. The blotches flanking the dorsal line terminate at the level of the cloaca and a single dark stripe extends along the dorsal surface of the tail. In light colored specimens, the apex of most of the dorsal scales is more densely pigmented.

The head is fairly heavily and darkly pigmented. The dark regions extend from the rostral through the eye onto the first and second temporals and spread out dorsally and laterally to the light region at the tip of the lateral stripe. The centers of the labial scales and the mid-ventral portion of the first temporal are lightened. A second light area may extend from the lateral aspect of the parietal onto the dorsal

second temporal and first dorsal scales. In some specimens the entire surface of the parietals is mottled with light and dark patches. Usually the middle of the internasal, and the dorsal borders of the prefrontals are lightened. The edges of the infralabials and the first pair of chin shields are darkened; thereafter pigmentation on the ventral surface of the head is irregularly blotched. The ventral surface of the body tends to be most heavily, though irregularly, pigmented along the midline. This darkened zone is flanked on each side by lighter regions and these in turn by darker ones.

Locality records.—SRI LANKA: Kanawarella Group (above Namunukula), 1520 m, CM 83455 (F 45, holotype), CM 83456 (F 50); Spring Valley road (above Namunukula), 1540 m, AMNH 120246 (F64), CM 83457 (F65); above Namunukula, 1520 m, CM 83458 (AL 35b), USNM 225091–225094 (AL 75a–75b, 75d–75e); Pindarawatta (west of Namunukula), 1520 m, CM 83459–83462 (AL 167a–167d).

Aspidura drummondhayi Boulenger

Aspidura drummondhayi Boulenger, 1904:95–96, plus one plate. Type locality: “Hopewell estate, Balangoda, . . . while clearing out drains in a field at the very top of the estate, the probable elevation being from 3500 to 4200 feet above sea level.” Syntypes: BM 1946.1.12.45–1946.1.12.46.

Aspidura drummond-hayi: Smith, 1943:338. Inappropriate emendation.

Diagnosis.—This species of *Aspidura* is characterized by the absence of a preocular scale; a prefrontal scale that forms the entire anterior border of the orbit and contacts supralabials two, three and four; having a lower postocular longer than the upper; both postoculars in contact with the parietal scale; and the anterior pair of the two pairs of chin shields one to two times the length of the posterior pair.

Fifteen dorsal scale rows are present along the body. The ventral counts are 113 to 119 and the subcaudal ones 18 to 26. Either all the subcaudals are divided, or only the posterior subcaudals are divided. Snout–vent lengths are 175 to 200 mm, tail lengths are 22 to 31 mm, midbody diameters are 6.0 to 7.0 mm (Table 2). Fig. 2 compares the major counts, Fig. 3 the body proportions and Figs. 6, 9, and 11 illustrate specimens.

Color pattern (preserved specimens).—The ground color is a rich chocolate brown dorsally and a slightly lighter brown ventrally. While there are traces of stripes and spots, these are not obvious to the unaided eye.

The snout is very dark up to the level of the eye. The dark region extends onto the temporals and the lateral edges of the parietals. The frontal and the rest of the parietals are slightly lighter than the snout. The more posterior supralabials show lightened centers, as do the first temporals and a number of lower dorsals on each side. The pigmentation of the dorsal ground color shows some faint mottling on indi-

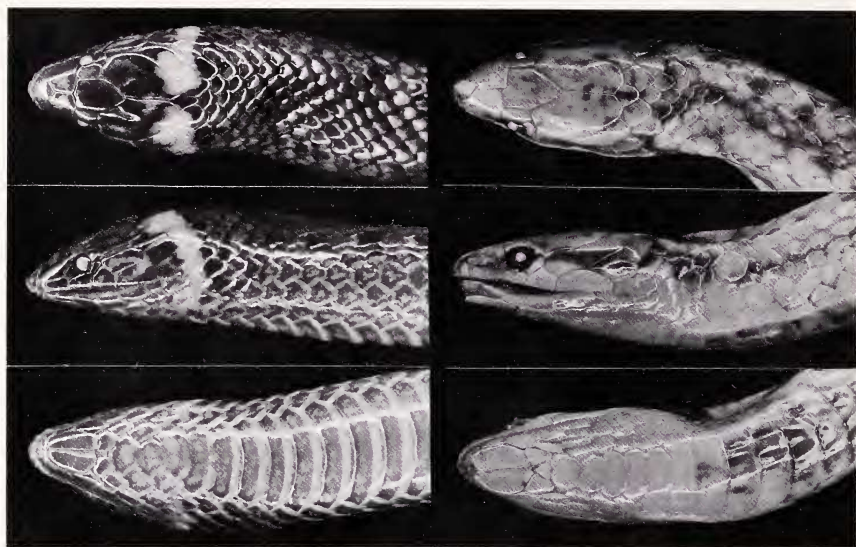


Fig. 7.—Dorsal, lateral, and ventral views of the head of (left) *Aspidura guentheri* (syntype BM 1946.1.12.16) and (right) *A. trachyprocta* (holotype ANSP 3308) to show scalation and color pattern.

vidual scales. The scales are iridescent. A darker middorsal scale row produces a one scale wide vertebral stripe that extends from the parietals to the tip of the tail. The middorsal scales appear darker because of a concentration of brown pigment in an anterior-posterior band across the center of the individual scales. There is a faint dark stripe on the fifth dorsal scale row on each side of the body. A more obvious lateral stripe occurs on the third dorsal scale row on each side. At the level of the vent it drops ventrally and continues to the tip of the tail above the first dorsal scale row on each side.

Under the dissecting scope the ventral pattern appears mottled anteriorly. At the level of about the twelfth ventral the ventral pigmentation is solid, and continues thus to the cloacal scale, the free edge of which is lightened. The ventral surface of the tail is solid brown.

Locality records.—SRI LANKA: Hopewell estate, Balangoda, 3500 ft–4200 ft, BM 1946.1.2.45–46 (syntypes of *A. drummondhayi* Boulenger, 1904; Deraniyagala, 1955); Balangoda Dist., *BM 1931.5.13.58–59; Sinharaja Army Camp, above Deniyaya, 1040 m, CM 83467 (CG 092519B).

Aspidura guentheri Ferguson

Aspidura guentheri Ferguson, 1876:819–820. Type-locality: “Ceylon, . . . close to the coast, and never far from it.” Syntypes: BM 1946.1.12.16–1946.1.12.26; MCZ 28467.

Diagnosis.—This species of *Aspidura* is characterized by a preocular scale that forms part of the anterior border of the orbit; a prefrontal scale that forms the remaining portion of the anterior border of the orbit and contacts supralabials two and three; having the upper postocular longer than the lower or both subequal in length; only the upper postocular in contact with the parietal scale; and the anterior pair of the two pairs of chin shields two to three times the length of the posterior pair.

Seventeen dorsal scale rows are present along the body. The ventral counts range from 103 to 122 (mean = 112.48 ± 2.53 , $N = 23$) and those of subcaudals from 18 to 29 (mean = 22.35 ± 1.12 , $N = 23$). The subcaudals are undivided. Snout-vent lengths range from 75 mm to 160 mm, tail lengths from 11 mm to 26 mm, midbody diameters from 2.8 mm to 5.0 mm, making this the smallest and most slender species of the genus (Table 2). Females have fewer caudals and a shorter tail than males, but are larger overall. Fig. 2 compares the major counts, Fig. 3 the body proportions and Figs. 7, 9, and 12 illustrate specimens.

Color pattern (preserved specimens).—These are slender brown snakes with a mottled dark dorsal surface and a lighter brown ventral one. They are immediately identifiable by a light-colored neck band that crosses from the top of the head to the infralabial region, though it may be interrupted narrowly along the mid-vertebral line and may be doubled along the side, leaving a dark patch on each cheek. The nuchal band is only lightly pigmented. The scales along the posterior edge of the nuchal band may be more densely pigmented than the other dorsal scales on the body. The ventral surface of the body and tail appear uniform beige, with the cloacal region sometimes indicated by a light line.

The pigmentation does not match the scale pattern. The side of the head tends to be dark from the rostral region onto the posterior supralabials, though the individual supralabials and first temporal may be centrally lightened. Similar lightening occurs on the tops of the internasal, prefrontals, and supraoculars and portions of the parietal scales. Some specimens have a very light nuchal band; these show a pair of light spots flanking the midline in the middle of the parietals. Some specimens have a light area with a central dark spot on the posterior supralabials and temporals. This is produced by the confluence of the light areas of the first temporal and fourth and fifth supralabials. On the dorsal surface of the body there are three rows of dark spots. Each spot is approximately the size of (but not coincident with) one dorsal scale. These lie on the level of the vertebral row and the fifth dorsal scale row on each side. Each spot is preceded by a lightly pigmented zone. In some instances similar light regions also occur on dorsal and ventral sides of the spots. Only the middorsal row of spots continues along the tail, the lateral rows fade just posterior to the vent.

Two dark lines or pigment concentrations may occur, respectively between the first and second and second and third dorsals on each side. They become most noticeable about the eighth ventral and continue onto the tail, where they occupy the sutures between the subcaudals and the first dorsal scale row and between the first and second dorsal scale rows. The center of the venter is beige. This color is produced by an even distribution of pigment. Toward the sides of the ventral scales the pattern may fade, producing a mottled effect that differs among specimens.

Locality records.—SRI LANKA: No locality, AMNH 120247 (AL 34), CM 83463 (AL 648c), *BM 74.4.29.1264–1265, 1921.6.15.11, 1931.5.13.71–73, 74.4.29.217, MCZ 15803, *ZSI 7021–7023, 8684–8685, [Colombo Museum, de Silva, 1972.] Near coast, BM 1946.1.12.16–1946.1.12.21, *1946.1.12.22–1946.1.12.26, MCZ 28467 (syntypes of *A. guentheri* Ferguson, 1876; Boulenger, 1890, 1893; Smith, 1943); Ratnapura, 130 m, [Colombo Museum, de Silva, 1972], CM 83464 (CG 092523), FMNH 172302–172306; Yapitikanda, Deniyaya, 500 m, CM 83465 (CG 092512B); Deniyaya, 500 m, CM 83466 (CG 092509B); Kandilpana, Deniyaya, 500 m, USNM 225078–225079 (CG 092514B1–092514B2); Neboda, *BM 97.10.20.12; Yala National Park, AMNH 104446; Rosagalla, MCZ 18053–18054. [Anasigalla Est., Matugama, Kalutara Dist., Colombo Museum, Wall, 1921b, 1923b, 1924; Deraniyagala, 1955; de Silva, 1972]. [Balangoda area, Smith, 1943; Deraniyagala, 1955].

Aspidura trachyrocta Cope

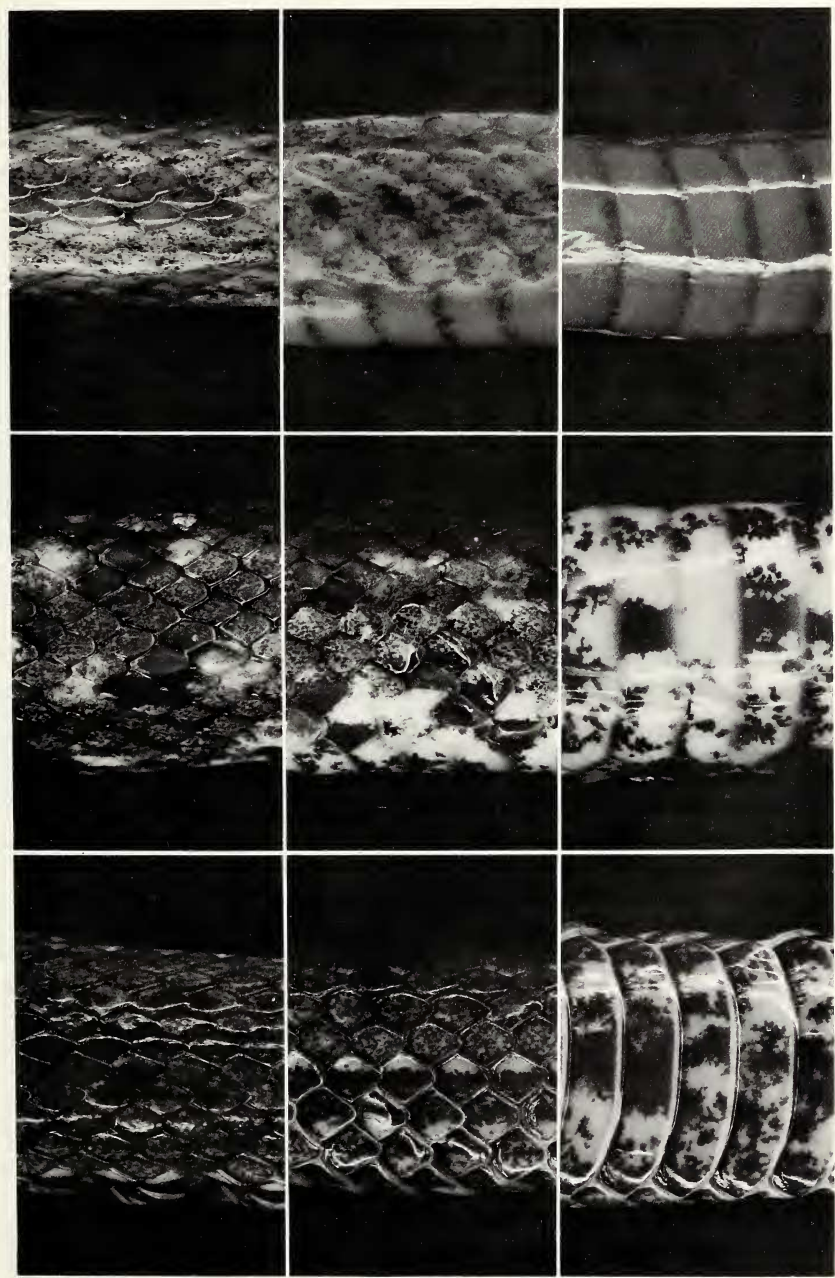
Aspidura trachyrocta Cope, 1860:75–76. Type-locality: "Ceylon." Holotype: ANSP 3308.

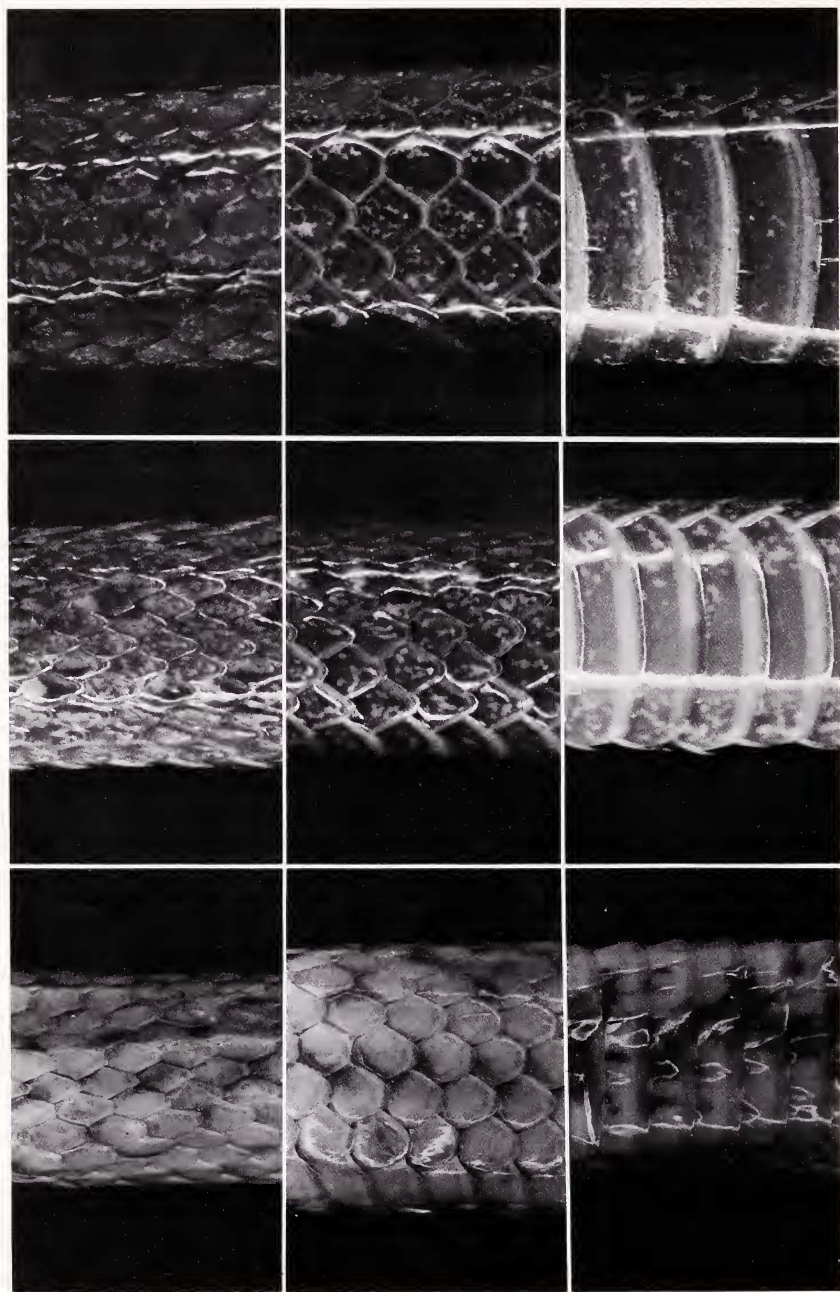
Diagnosis.—This species of *Aspidura* is characterized by a preocular scale that forms part of the anterior border of the orbit; a prefrontal scale that forms the remaining portion of the anterior border of the orbit and contacts supralabials two and three; having the lower postocular longer than the upper; both postoculars in contact with the parietal scale; and the anterior pair of the two pairs of chin shields two to three times the length of the posterior pair.

Fifteen dorsal scale rows are present along the body, except in the region of the head, where two additional rows occur near the dorsal midline. These never persist beyond ventral number 16. The ventral counts range from 128 to 151 (mean = $137.66 \pm .84$, $N = 140$) and subcaudals from 11 to 26 (mean = $18.70 \pm .74$, $N = 139$). The subcaudals are undivided. Snout–vent lengths range from 85 mm to 383 mm, tail lengths from 8 mm to 40 mm, midbody diameters from 2.5

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Fig. 8—Dorsal (left), lateral (middle), and ventral (right) views at midbody of *Aspidura brachyorrhos* (top), *A. copei* (middle), and *A. deraniyagalae* (bottom). Same specimens as Figs. 4 and 5.





mm to 13.9 mm (Table 2). Females tend to have more ventrals, and shorter tails than males, but males and females do not differ in total length. Fig. 2 compares the major counts, Fig. 3 the body proportions, and Figs. 7, 9, and 12 illustrate specimens.

Color pattern (preserved specimens).—These are stout brown snakes with a spectacular diversity of dorsal and ventral coloration. They range from an extremely dark blackish brown dorsal surface, sometimes relieved by traces of lighter interscalar skin, to a light brown dorsal color with indications of lateral stripes and two or usually three rows of dark dorsal spots. In the dark specimens the head is totally dark, in light individuals there is indication of a light, dark-bordered lateral stripe running posteriorly from the snout, often interrupted above the eye, and continuing across the lateral edges of the parietals onto the temporals. The light stripe on the head is faintly noticeable even in very dark specimens. Posterior to the orbit it reaches from the anteriolateral portion of the parietals backward to the dorsal half of the temporals and onto the two or three dorsals flanking the first and second vertebrae. The second vertebral is sometimes light providing a confluence between the light stripes of the two sides.

A dark stripe starting near the internasal, spreads posteriorly over the ventral edges of the prefrontals to include the eye, passes over the temporals and the first two to four dorsal scales posterior to the temporals and then bends first ventrally and then posteriorly sometimes forming a dark lateral stripe on dorsal scale rows two and three on each side of the body. The stripe may become continuous with a lateral stripe present between dorsal scale rows two and three along the body. A dark region extends over the azygous frontal and the middle of the two parietals, and continues posteriorly along the anterior portion of the vertebral scale row. The frontal and the dorsal halves of the parietals tend to be well pigmented. The supraocular scales may be lightened. The supralabials are light colored except for the sutures. The zone posterior to the angle of the mouth is also lightly pigmented.

Often the light beige colored dorsal surface is marked by a row of vertebral spots. Each of these spots is approximately as large as a single dorsal scale and successive spots in a series are separated by two to four lightly pigmented dorsals. The spots are flanked on each side by a row of staggered spots also about as large as a single dorsal scale. The array of these dorsal spots is very irregular. Sometimes the

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Fig. 9.—Dorsal (left), lateral (middle), and ventral (right) views at midbody of *Aspidura drummondhayi* (top), *A. guentheri* (middle), and *A. trachyprocta* (bottom). Same specimens as Figs. 5 and 6.

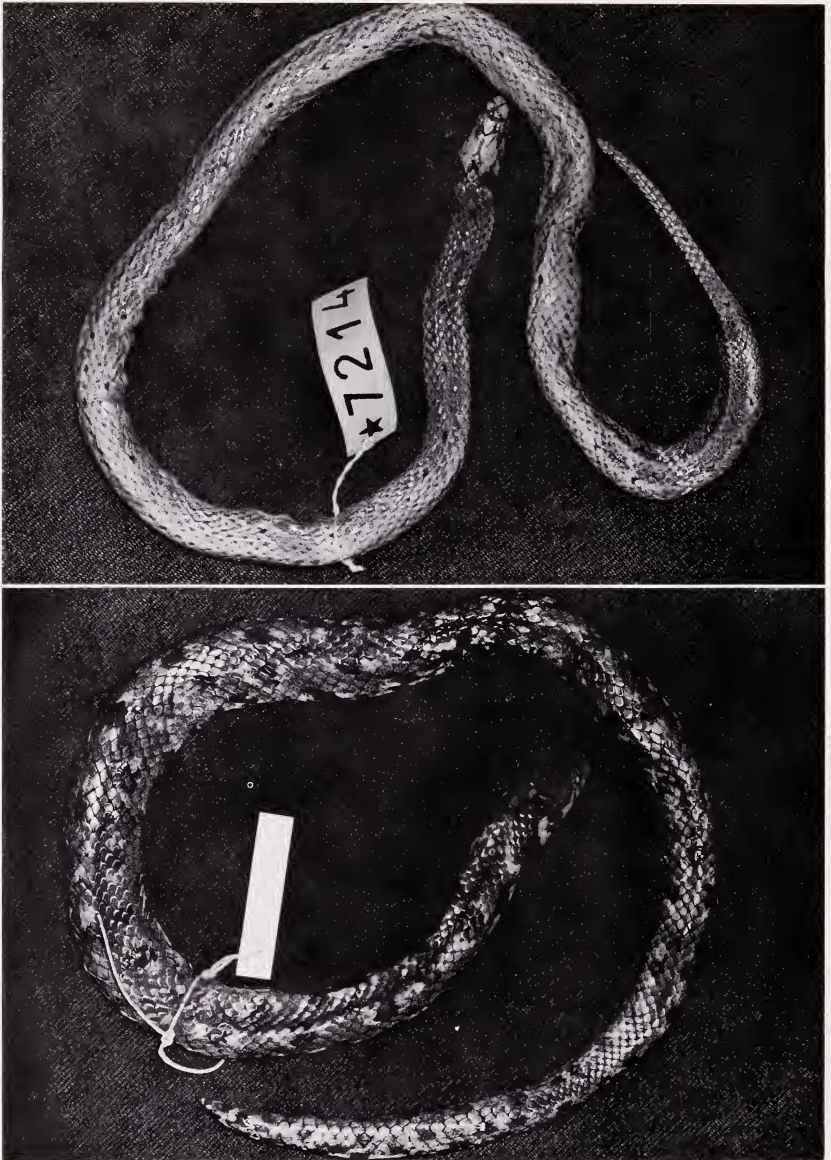


Fig. 10.—Dorsal views of whole specimens of (top) *Aspidura brachyorrhos* (MNHP 7214) and (bottom) *A. copei* (BM 1946.1.12.9).

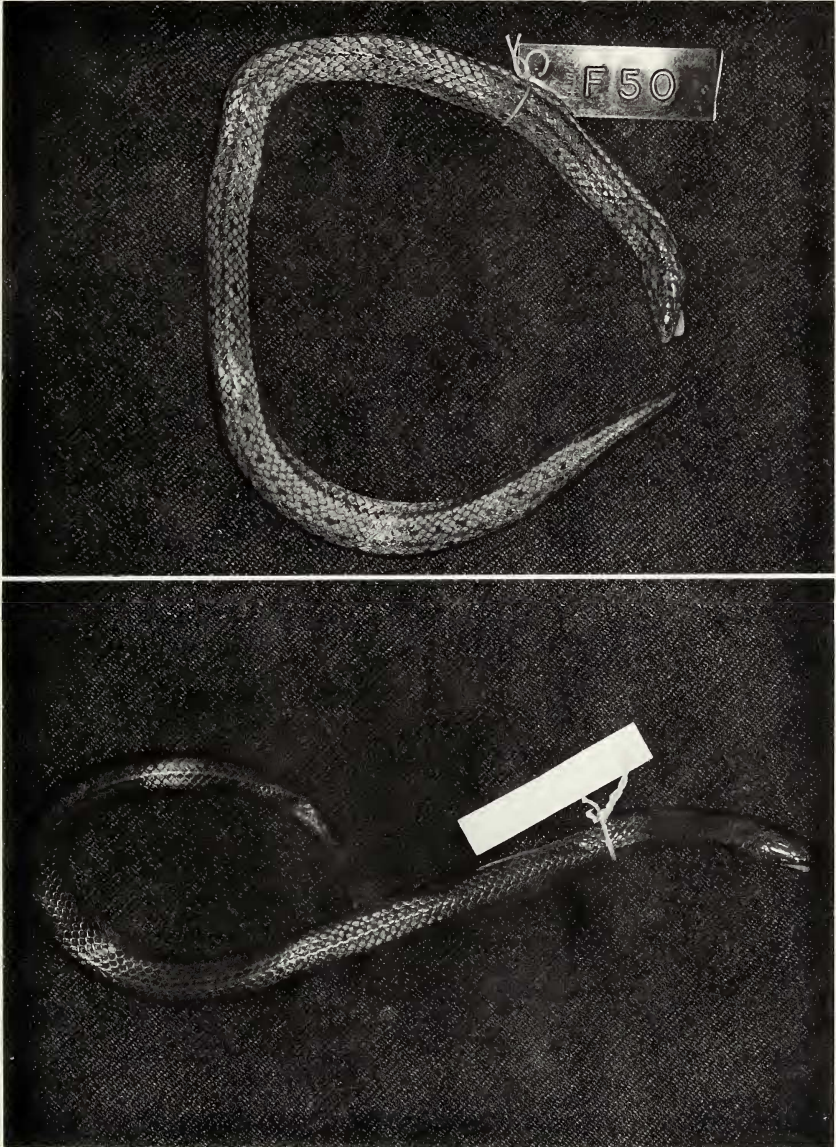


Fig. 11.—Dorsal views of whole specimens of (top) *Aspidura deraniyagalae* (paratype, CM 83456) and (bottom) *A. drummondhayi* (BM 1946.1.12.45).

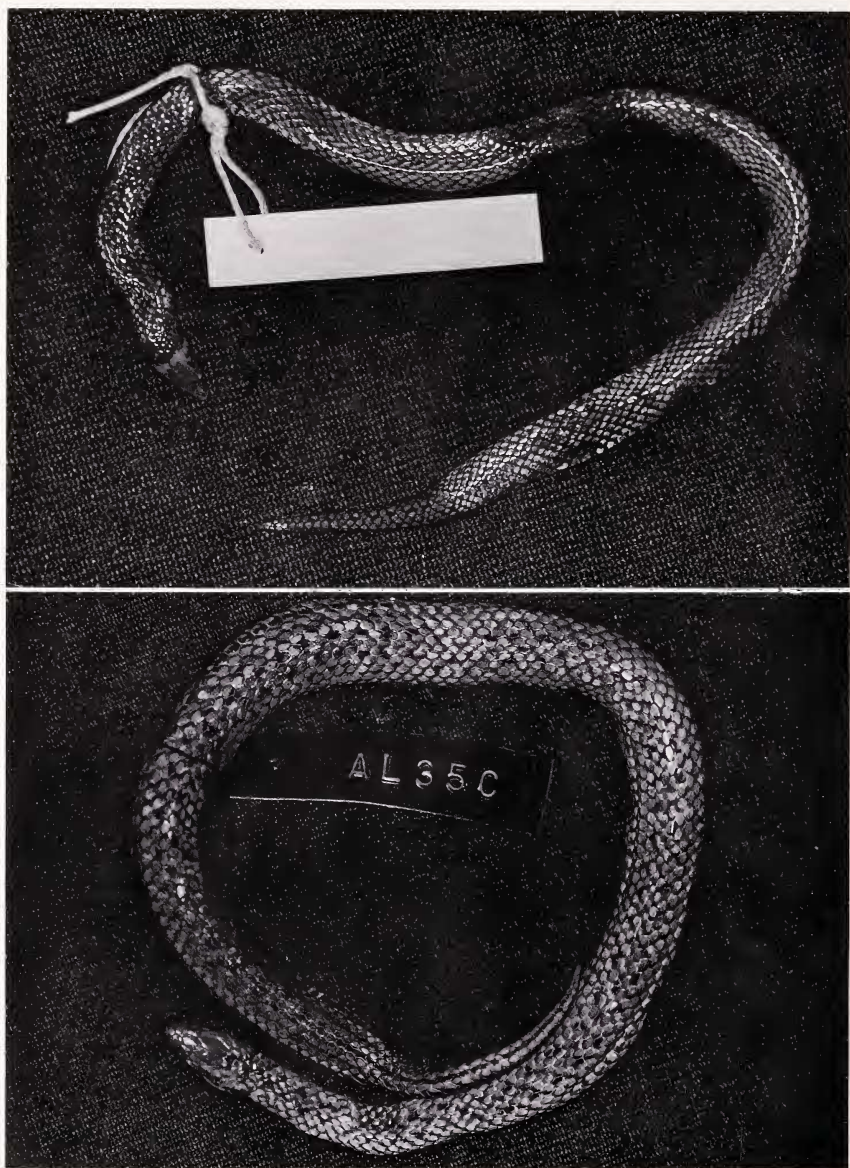


Fig. 12.—Dorsal views of whole specimens of (top) *Aspidura guentheri* (BM 1946.1.12.19) and (bottom) *A. trachyprocta* (AMNH 120249).

spots in the midline drop out for short intervals, or are absent along the entire body. The various dorsal blotches approach each other and tend to coalesce near the level of the cloaca and form a dark vertebral stripe that runs along the tail to its tip.

The zone between the second and third dorsal scale rows on each side tends to be darkened, giving the impression of a more or less continuous dark stripe that extends either along the entire body, or only on the posterior two thirds of the body, becoming gradually wider and continuing onto the tail. Very dark specimens have an unmarked dorsal surface anterior to the level of the fifteenth ventral preceeding the vent. More posteriorly they show a series of light colored areas distributed along either the dorsal portion of the third dorsal scale row or the fourth dorsal scale row on each side; these give the impression of a poorly expressed, light lateral stripe that extends onto the tail in lighter colored specimens. This light stripe may run the entire length of the body in those animals having a complete dark stripe between scale rows two and three.

Only a few generalizations can be made about the pattern of ventral pigmentation. The ventral surface may be heavily blotched with black, which often becomes solid in the precloacal region and on the tail. The opposite end of the spectrum is a completely light colored ventral surface, lacking more than incidental blotching except on the midline of the tail. In most animals the pigmentation tends to be darker posteriorly. Usually the ventral surface shows a striking contrast between light and dark colors; however, a few specimens show dispersed pigmentation in the light colored regions. A dark midventral line is often present. This is usually formed by dark medial blotches though these may not occur on every scale. In some specimens these blotches form an irregular pattern. In other specimens the midline is light and the dark dorsal color extends variably onto the sides of the ventrals.

Living specimens vary between light reddish brown and blackish-brown dorsally with the ventral surface yellowish (sometimes with a reddish tint) and the ventral blotches brown to black.

Locality records.—SRI LANKA: No locality (in mountains), CM 83486 (AL 638b), AMNH 24671, ANSP 3308 (holotype of *A. trachyprocta* Cope, 1860), *BM 60.3.19.1266, 80.2.2.120, FMNH 10901, 27264, 124118–124119, *KU 68900, MCZ 3174, 9304, [Vienna-Novara Museum, Jan, 1862, 1863; Jan and Sordelli, 1865, (13), pl. 2, 1], USNM 19214, 56150 (Taylor, 1950), *ZSI 4424, 7025, (Günther, 1864; Boulenger, 1890, 1893, 1896; Theobald, 1876); Gammaduwa, 750 m, CM 83468 (F 375); Monaragala, FMNH 142404; Labukelle, 1733 m, CM 83536–83539 (AL 546a–546d); USNM 225083–225090 (AL 546e–546i); Harasbedda, 1355 m, CM 83469 (AL 574); Eskdale, 1716 m, CM 83470–83471 (AL 217a–217b), AMNH 120248 (AL 217c), CM 83534 (AL 218, broken); Medamaha Nuwara, 3500–4000 ft, *BM 1969.2735–2742; Pundaluoya, 4000 ft, *BM 1905.3.25.92–1905.3.25.94; Langton Estate, (nr. Talawakele), 1230 m, CM 83472–83475 (F 153–156); Talawakele, Diyagama West Estate, 4500 ft, CM 83535 (AL 228, broken), FMNH

121474–121479; Nuwara Eliya, 2100 m, CM 83476–83477 (AL 461a–461b), AMNH 94447, *KU 24139 (Taylor, 1950), *ZMB 3035, [Geneva, Jan. 1863; Jan and Sordelli, 1865, (13), pl. 2, 3; Deraniyagala, 1955]; Nanu Oya, (4000–5000 ft) FMNH 131365–131370; Sita Eliya, 1740 m, CM 83478–83482 (F 82–89); Maha-Eliya, 5000–6000 ft, FMNH 121947–121948; Ambawela, 1790 m, CM 83487–83498 (F 90–104), CM 83483–83485, 83500–83507 (F 107–117); Pattipola, 1890 m, AMNH 85082, CM 83499 (F 105), *NMSL C1A, *ZSI 17032, 17555 (6200 ft); Garden above Hakgala, F 81 (eggs); Horton plains, AMNH 85081, *NMSL C1/A–F (Wall, 1905), *ZSI 17553–17554; Bopatalawa, Horton Plains, *BM 1972.2175–1972.2176; Ohiya, *NMSL E-1; Pindarawatta (at Namunukula), 1500 m, CM 83508 (AL 35a), AMNH 120249 (AL 35c), CM 83509–83510 (AL 35d–35e), CM 83511–83518 (AL 72a–72h), CM 83519 (AL 75c), CM 83520 (AL 88), USNM 225080–225082 (AL 157a–157c), CM 83521–83522 (AL 167e–167f), CM 83523–83524 (AL 185a–185b), CM 83525 (AL 190), CM 83533 (AL 219); Kanawarella group, (above Namunukula), 1520 m, CM 83526–83528 (F 42–44), CM 83529–83532 (F 46–49), AMNH 120250–120251 (F 51–52); Namunukula, 4000 ft (in trench) FMNH 120908–120910, 120912; Kurnbakkann (?), MCZ 34890–34908. [Kandy, Radella, Ramboda and Diyatalava, Deraniyagala, 1955]. [Uva Patnas (district), Wall, 1921a, Deraniyagala, 1955; considered error, Wall, 1923c]. [Kambaddy, ZSI 7015 (not located), Sclater, 1891]. [Maldiv Islands: Malé Atoll, Laidlaw, 1902. Phillips, 1958, makes reference to this unlikely report, but notes under his entry for *Lycodon aulicus* “said to be the only snake known in Malé.” However, Laidlaw, 1902, did note that “the close connection with Ceylon is probably a growth of quite recent date. The principal trade relations . . .,” a phrasing that suggests his view that some of the fauna might have been introduced by man.] As *Aspidura trachyprocta* is a montane form and as montane *Aspidura* are quite sensitive to elevated temperatures and die within days when brought down to sea level (Gans unpublished), and as the earlier report of *Aspidura trachyprocta* from the Malé atoll is undocumented by any specimen, it is here considered to be in error.

Species incertae sedis

Haly's (1886, 1889) comments on various species lack sufficient information to evaluate his identifications. Nicholson (1893) listed *A. brachyorrhos*, *A. copei*, and *A. trachyprocta* without localities and with misleading characterizations. Fletcher (1908) cites an *A. trachyprocta* from Bandarawela that has a preocular on one side only. Pearlless (1909) cites *A. brachyorrhos* from Badulla without further reference. Sarasin (1910) lists the species in a table.

de Silva (1972) lists as *A. trachyprocta* a number of Colombo Museum specimens from Ratnapura, Haputale, Kotmale, Pattipola, Nanu Oya, Dickoya, Hakgala, and Horton Plains. However, his definition of the species mentions that the upper postocular is larger than the lower and notes that only the upper postocular contacts the parietal. These characters never occur in specimens here assigned to *A. trachyprocta*, but are characteristic of the form here called *A. guentheri*.

The data for some of the specimens collected by the Brothers Sarasin appear to have become mixed. Thus, Müller notes two (1885), 11 (1887), and two (1890) specimens of *A. trachyprocta* from Nuwara Eliya and five *A. brachyorrhos* from “Peradenia, Nuwera Ellia” (Mül-



Fig. 13.—Egg shell and embryo (one of five) of *Aspidura trachyprocta* taken near Hak-gala (F 81).

ler, 1887); the latter clearly representing a mixture of two disparate sites.

BIOLOGICAL OBSERVATIONS

Aspidura brachyorrhos.—Some specimens (CM 83448, AL 103a; AMNH 120244, AL 1036) were found in tea plantations among ground cover. FMNH 120911 is labelled "4000' in trench" a label that also applies to an *A. trachyprocta*. BM 1968.872 is labelled "3500', dug up in loose soil on steep river bank." The species deposits two to five eggs measuring 28 by 8 mm (Wall, 1921a; Smith, 1943; Deraniyagala, 1955). In the present sample, egg numbers were five in CM 83448 (AL 103a) and CM 83446 (AL 648a), and six in CM 83451 (AL 548a).

Aspidura copei.—A female taken at Avissawella in January 1906 contained 21 eggs, measuring $3/4"$ by $1/2"$ (not 20 by 103 mm, as in Deraniyagala, 1955; Willey, 1906, see above).

Aspidura deraniyagalae.—Specimens were taken in humus (CM 83455, F 45) or mulch (AMNH 120246, F 64; CM 83457, F 65) piles in irrigated agricultural land amid tea bushes. In the present sample egg

numbers were two in CM 83461 (AL 167c) and USNM 225091 (AL 75a) and four in CM 83458 (AL 35b).

Aspidura drummondhayi.—The holotype was noted to be “viviparous,” and was taken from drains in the same field as *Aspidura copei* (Boulenger, 1904). Specimen CM 83467 (CG 092519B) contained four eggs.

Aspidura guentheri.—Wall (1921b) mentions two eggs, but later (1923b, 1924) noted that almost all specimens of a much larger series each contained only a single egg. In the present sample, egg numbers were two in CM 83466 (CG 092509B) and USNM 225078 (CG 092514B1) and three in USNM 225079 (CG 092514B2). Wall (1921b, 1923b, 1924) reported the presence of earthworms in the stomachs of some specimens.

Aspidura trachyprocta.—A series of specimens F 50, CM 83526–83532 (F 42–49), AMNH 120250–120251 (F 51–52) were collected above Namunukula in the same field and humus piles as *Aspidura deraniyagalae* and *Rhinophis drummondhayi*. Prefers leaf mold and rotten timber. Oviparous, 4 to 12 eggs, 25 by 16 mm. The eggs of the two ovaries mature sequentially “probably due to two separate copulations” (Deraniyagala, 1955). In the present series, egg count was six in CM 83522 (AL 167f). A clutch of five, near-term eggs was dug up from a depth of 15 cm in a moist, grassy open area near Hakgala (Fig. 13). *A. trachyprocta* apparently feed on earthworms (Wall, 1921a). Wall (1921a) found a specimen of *A. trachyprocta* in the stomach of another snake, “*Ancistrodon hypnale*.” Parasitized by nematode *Kali-cephalus brachycephalus* (Crusz and Sanmugasunderam, 1974).

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